Council of the European Union

Brussels, 12 February 2025
(OR. en)

6014/25
ADD 13

ENV 63
CLIMA 27
AGRI 46
ENER 21
TRANS 22
PROCIV 11

COVER NOTE

From:	Secretary-General of the European Commission, signed by Ms Martine DEPREZ, Director
To:	Ms Thérèse BLANCHET, Secretary-General of the Council of the European Union
No. Cion doc.:	SWD(2025) 25 final
Subject:	COMMISSION STAFF WORKING DOCUMENT Third River Basin Management Plans Second Flood Hazard and Risk Maps and Second Flood Risk Management Plans Member State: Germany Accompanying the document REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT on the implementation of the Water Framework Directive (2000/60/EC) and the Floods Directive (2007/60/EC) Third River Basin Management Plans Second Flood Risk Management Plans

Delegations will find attached document SWD(2025) 25 final.

Encl.: SWD(2025) 25 final

EUROPEAN
COMMISSION

Brussels, 4.2.2025
SWD(2025) 25 final

COMMISSION STAFF WORKING DOCUMENT

Third River Basin Management Plans
Second Flood Hazard and Risk Maps and Second Flood Risk Management Plans
Member State: Germany

Accompanying the document

REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

on the implementation of the Water Framework Directive (2000/60/EC) and the Floods Directive (2007/60/EC)

Third River Basin Management Plans
Second Flood Risk Management Plans

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{SWD(2025) 15 final} - {SWD(2025) 16 final} - {SWD(2025) 17 final} -
{SWD(2025) 18 final} - {SWD(2025) 19 final} - {SWD(2025) 20 final} -
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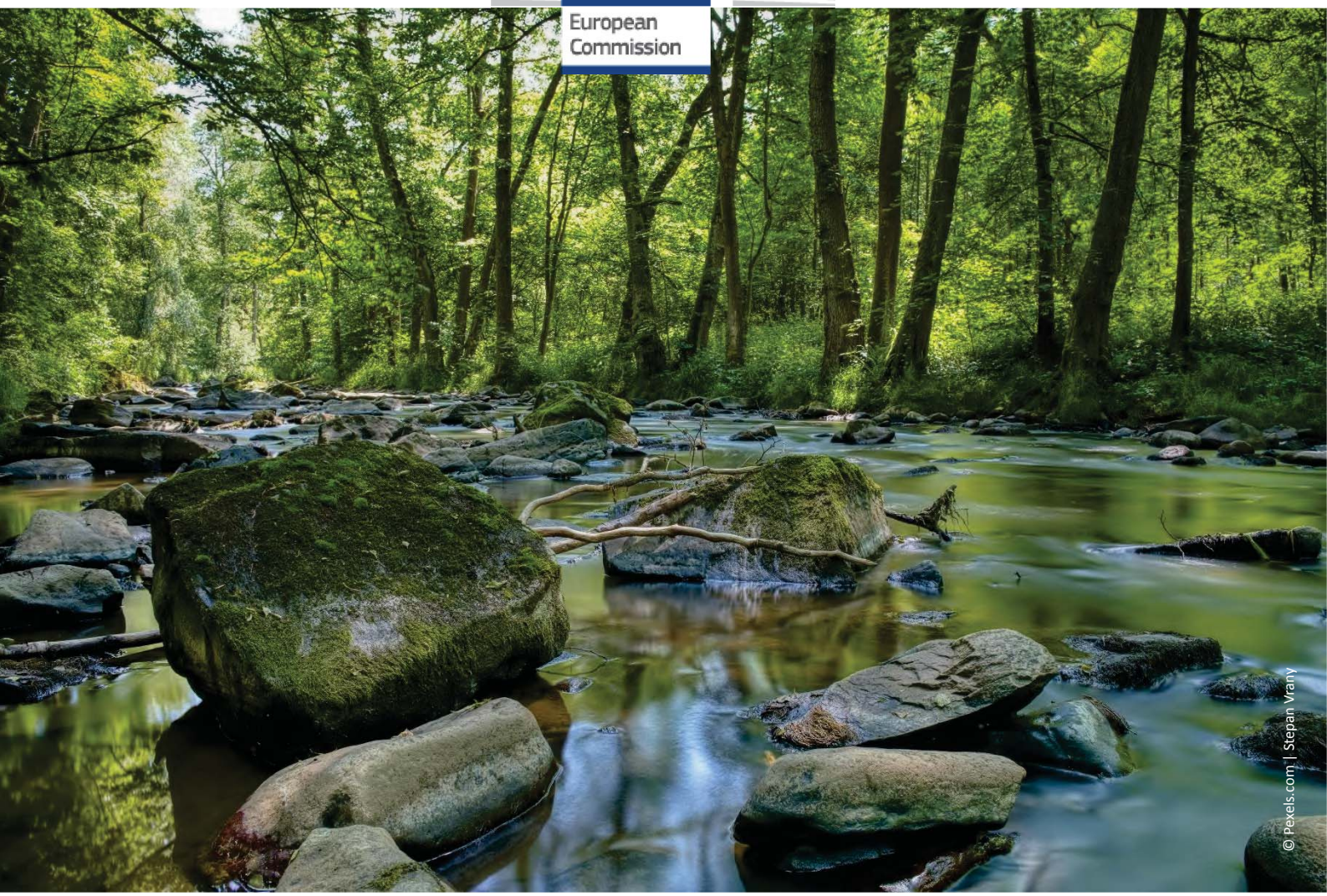
European Commission



Country specific staff working document

Germany

ENVIRONMENT
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SECTION A:

WATER FRAMEWORK DIRECTIVE

1. General info, member state characterisation

Germany has a population of 84 million inhabitants[1] (with a population density 236 persons per km^2 more than twice the EU average) and a surface area of 357,582 km2 and a marine area close to 56,000km^2 split between the North Sea North Sea and the Baltic and is bordered by nine other countries. The northern part of the country consists of lowlands with the southern part of the country consisting of the Alps, in-between are forested upland regions.

Germany has designated ten River Basin Districts. Most German rivers follow the general north-northwest ward inclination of the land, eventually entering the North Sea. This does not hold Danube, which flows eastward, to the Black Sea. Germany shares six RBDs with other countries and for several of them, it holds the estuary position. This entails that the quality and quantity of its waters also depends on decisions taken in other countries.

Water availability has traditionally been high with 791 millimetres precipitation (30-year average)

Figure 1. Map of the River Basin Districts of Germany with low risks for droughts but high flood risks However,

some regions in central and eastern Germany already had water shortages in the past and recently dry seasons have become more frequent and longer lasting. Agriculture occupies 47% of the land and the country is the world's 4th largest exporter of agricultural products. The country also hosts the third largest harbour in Europe in Hamburg.

[1] Statistics | Eurostat (europa.eu)

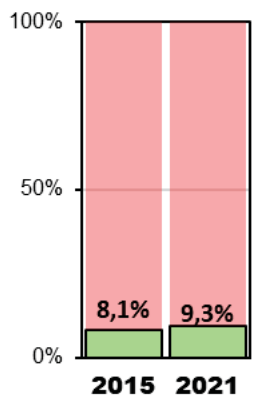
Reporting

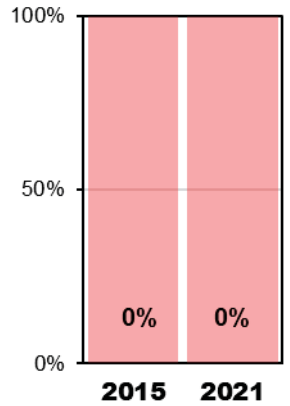
The deadline for reporting the 3rd RBMPs was in March 2022. The Commission and the EEA together with Member States developed an electronic reporting system in WISE (Water Information System for Europe). Its use was voluntary. Some Member States used it to fulfil their obligations, others reported the plans in pdf format. The cut-off date for the WISE e-reporting was September 2023 and the MS were assessed based on the datasets available by this date.

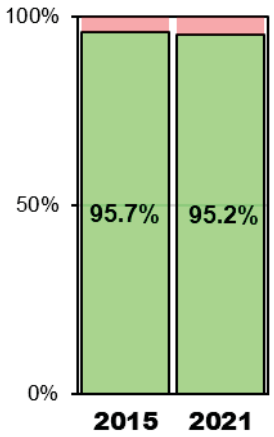
By September 2023 Germany have not submitted full electronic reporting, but data for majority of RBDs were available. Therefore, the assessment is based on the dataset available at that time and the missing RBDs are based on the data mining of the pdf RBMPs.

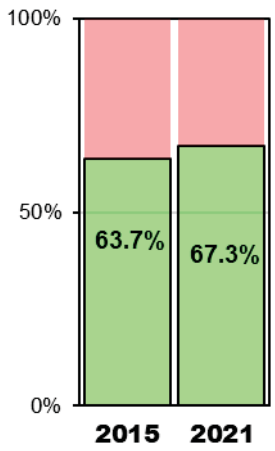
Despite the cut off dates for the production of this report, reporting continued, and for the State of Water report, the EEA aggregated the results available by July 2024 in their products and dashboards available at WISE Freshwater web portal.

Table 1. Changes in Status, Pressures, Exemptions & Measures

Surface Water Bodies (9744)	Trend (% good status/potential)	Main Pressures & Changes & Exemptions
ECOLOGICAL STATUS		Germany achieved good ecological status/potential in only 9.3% of SWBs, which is a slight improvement compared to the 2nd RBMPs. DE expects around 10% to be in good status by 2027 but does not explicitly explain this high proportion of status failure. In general, diffuse nutrient pollution from agriculture and physical alterations to the SWBs for agriculture and flood protection are identified as significant pressures in all RBDs. The largest gap in status is quantified for agricultural pollution for all surface waters including coastal waters. Although water abstraction is not identified as a significant pressure in all RBDs, several studies point to emerging water scarcity issues e.g. in)Eastern Germany. It remains partly unclear which measures are taken to prevent nutrient pollution and how these relate to legal requirements e.g., from the EU Nitrates Directive. Clear improvements in relation to monitoring were made, with all biological quality elements now being monitored and reported compared to 2015. Germany has made clear improvements in implementing e-flows. This is important for safeguarding the ecologic status of surface water bodies and the quantitative status of groundwater bodies especially in the light of an expected aggravation of water scarcity and drought issues due to climate change. Exemptions were applied under Article 4(4) for technical feasibility to 24%, for disproportionate cost to 24.2%, and for natural conditions to 51.2% of SWBs for ecological status. Article 4(5) exemptions were applied to 0.2% of SWBs each for technical feasibility and disproportionate cost. Article 4(7) exemptions have been applied to 0.2% of SWBs for new modifications.

CHEMICAL STATUS		100% of SWBs are in poor chemical status/potential, mainly due the ubiquitous Persistent, Bio-accumulative and Toxic substances (uPBTs) mercury and PBDEs. These substances are mainly emitted during combustion of fossil fuels and industrial use, and enter surface waters through atmospheric deposition, which is the main pressure on SWBs in DE. Under exclusion of uPBTs, chemical status improves, ranging from 59% in good status in the Rhine RBD to 95% in good status in the Ems RBD. Substances that are of further importance depend on the region. Among them are e.g. pesticides, PFOS from industrial emissions, and fluoranthene from fossil combustion. In the NRW Rhine catchment for example PFOS form industrial use put pressure on SWBs. DE expects 0% of SWBs to achieve good chemical status/potential by 2027. DE monitors all SWBs for chemical status/potential and classifies with high confidence, with remaining gaps in trend analysis and insufficient detail in reporting. Exemptions are applied under Article 4(4) for technical feasibility to 0.4%, for disproportionate cost to 0.7%, and for natural conditions to 63.1% of SWBs for chemical status. Article 4(5) exemptions were applied to 0.1% of SWBs each for technical feasibility and disproportionate cost.

Ground Water Bodies (1291)	Trend (% good status/potential)	Main Pressures & Changes & Exemptions
QUANTITATIVE STATUS		Since the 2nd RBMPs, DE's number of GWBs has increased by 10% due to aggregation and splitting. This affects the observed trend in quantitative status, which shows a slight deterioration with 11 additional GWBs failing to achieve good status since 2015. Germany achieved good quantitative status in 95.2% of GWBs, which is a slight decrease compared to the 2nd RBMPs. DE expects 98% of GWBs to achieve good quantitative status by 2027. Most of the GWBs fail good status because their levels are lowering due to over abstraction, followed by damages to dependent terrestrial ecosystems and associated surface waters. Overall, cooling water in electricity generation is the most common use of water (although mostly surface waters are used for this purpose) before households and industry with 25% and 19% respectively. Total water abstraction has decreased by 15% since 2016, through a less water-intensive energy sector. Agriculture only constitutes 1.7% of the total abstractions in DE with an increasing trend. Recent studies show that DE is experiencing climate change induced water loss from soils and vegetation and record-low levels of GWBs throughout different regions. Exemptions are applied under Article 4(4) for technical feasibility to 0.7% and for natural conditions to 0.9% of GWBs for quantitative status. Article 4(5) exemptions have been applied to 1.5% of GWBs for technical feasibility, and 0.1% for disproportionate cost. Article 4(6) exemptions have been applied to 0.4% of GWBs on the grounds of natural conditions. Article 4(7) exemptions have been applied to 1.1% of GWBs for new sustainable human development.

CHEMICAL STATUS		The chemical status of GWBs in DE has improved slightly. Germany achieved good chemical status in 67.3% of GWBs, which is a slight increase compared to the 2nd RBMPs. GWBs mainly fail because of their water quality, followed by deterioration of drinking water quality, as well as damage to associated surface waters. pH, electrical conductivity, and dissolved oxygen seem not to be monitored in all RBDs. For groundwater, 'diffuse – agricultural' is the pressure reported to affect the highest percentage of water bodies. The 242 GWBs that are reported in poor chemical status, fail to achieve good chemical status, mainly due to the general water quality assessment. GWBs at risk of failing good status by 2027 are incomplete due to the delayed electronic reporting in Rhine and Weser (which contain almost half of all GWBs). Based on the incomplete data from the 3rd RBMPs e-reporting, at least 23.2% of the GWBs are at risk of failing to achieve good chemical status by 2027. 17% of the GWBs are expected to fail to achieve good chemical status by 2027. Nitrate is the pollutant responsible for the greatest risk. Examples of other relevant groundwater pollutants are pesticides, pharmaceuticals, and industrial pollutants like PFAS. Exemptions are applied under Article 4(4) for technical feasibility to 4.6%, for disproportionate cost to 0.2%, and for natural conditions to 16.8% of GWBs for chemical status. Article 4(5) exemptions have been applied to 1.3% for technical feasibility, and 0.3% for disproportionate cost.

2. Horizontal aspects

2.1 Governance

Germany has streamlined its governance with the river basin approach by reducing the number of competent authorities to one for each of the ten (instead of 16 before) river basin district (RBDs) thereby improving coordination arrangements between the German federal states ('Länder'). This may be one reason why all ten RBDs have been finalised and published on time. In this process, the LAWA (the German Working Group on water issues of the Federal States and the Federal Government represented by the Environment Ministers Conference (UMK)) continues to play an essential role in ensuring coherent and coordinated approaches for the implementation of the Water Framework Directive (WFD) in Germany and is encouraged to facilitate further internal harmonisation. It has issued several guidance documents or set minimum standards for all Länder and RBDs which has led to a further convergence of implementation approaches across the RBDs. Still there are shortcomings in terms of a streamlined, let alone, harmonised application of the Directive across RBDs and Länder.

International coordination in the six international RBDs is still strong. Moreover, Germany has invested significantly in the work of the international river conventions. However, there is limited evidence that more harmonised approaches have been developed (see recommendation 2019) which still leads to different approaches taken for the different major river basins, and differences in progress as well with the international Oder RBD having made the least progress. The analysis underscores the persistent challenges in meeting water quality objectives by 2027, particularly in basins with international cooperation, due to persistent issues with nutrient pollution, fluctuating concentrations, and limitations in achieving the targets. To achieve the objectives of the WFD more effectively and enhance water resilience, Member States including Germany should further enhance transboundary cooperation, in particular as regards e.g.:

a) Delineation and characterisation of water bodies, as well as joint or coordinated monitoring programmes and status assessment methodologies (e.g. commonly agreed reference conditions for biological quality elements and EQSs for pollutants);
b) Quantitative aspects of water management through relevant international cooperation mechanisms and bodies.

Significant public participation efforts are still taking place in all RBDs in line with the minimum requirements. In addition, most RBDs undertook additional public information and communication activities as well as a broad range of stakeholder engagement activities to involve them in the preparation of all RBMPs. The coordination between the preparation of the River Basim Management Plans (RBMPs) and the Flood Risk Management Plans (FRMPs) continues to be strong with consultations done in parallel, joint implementation taking place and synergies at the level of measures identified. This is not always the case for the coordination with the Marine Strategy Framework Directive (MSFD). Some RBMPs include the MSFD objectives but except for the Weser RBD, the references are superficial. A more joined up approach happens on the identification of measures but there is no evidence that competent authorities are coordinating effectively, e.g. through joint consultation processes or coordinated reporting when it comes to land-based pollution sources for the marine. Similar deficiencies in joint implementation seems to exist with other related pieces of legislation of relevance, as it appears from the information provided on protected areas.

In terms of obstacles in the implementation of measures planned under the 2nd RBMPs, Germany identified including lack of finance, of mechanism, acceptance, and staff resources. Moreover, further digitalisation in administrations and more effective and open data management, e.g. by better connecting information systems between the different authorities involved in the implementation of the WFD, also outside the environment domain, is another avenue to explore to improve governance.

2.2 Characterization of River Basin District

Germany designated a total of 9744 surface waterbodies and 1291 groundwater bodies in its 3rd RBMPs. There has been an increase of 9.6% in the total number of delineated groundwater bodies, because of splitting, aggregation and/or creation of new GWBs, compared to the previous cycle. As regards surface water bodies, the numbers have only changed slightly compared to the previous cycle. For rivers the number were largely the same (-1%), 738 lakes (+1%), 5 transitional waters (no change), 71 coastal waters (-5%) and 7 territorial waters (not reported in 2015). Although this appears to be a rather stable situation, there have been significant changes in the delineation of river water bodies (16%) and lake water bodies (14%), pointing to a refinement of the characterisation. Around 66 surface water bodies (125 in the 2nd RBMPs) and 428 groundwater bodies (2833 in the 2nd RBMPs) are designated as protected areas for drinking water and therefore subject to additional protection.

Table 2. Overview of Germany's River Basin Districts (RBDs)

RBD	Name	Size (km²)	% share of total basin in DE	Countries sharing RBD
DE1000	Danube	56265	7.0	AT, BA, BG, CH, CZ, HR, HU, IT, MD, ME, MK, PL, RO, RS, SI, SK, UA, AL
DE2000	Rhine	105925	54	AT, BE, CH, FR, IT, LI, LU, NL
DE3000	Ems	17391	84	NL
DE4000	Weser	49061	100	-
DE5000	Elbe	99539	65.5	AT, CZ, PL
DE6000	Oder	9686	7.7	CZ, PL
DE7000	Maas /Meuse	3976	11.6	BE, FR, LU, NL
DE9500	Eider	9344	-	DK
DE9610	Schlei/Trave	9222	99.9	DK
DE9650	Warnow/Peene	21094	100	

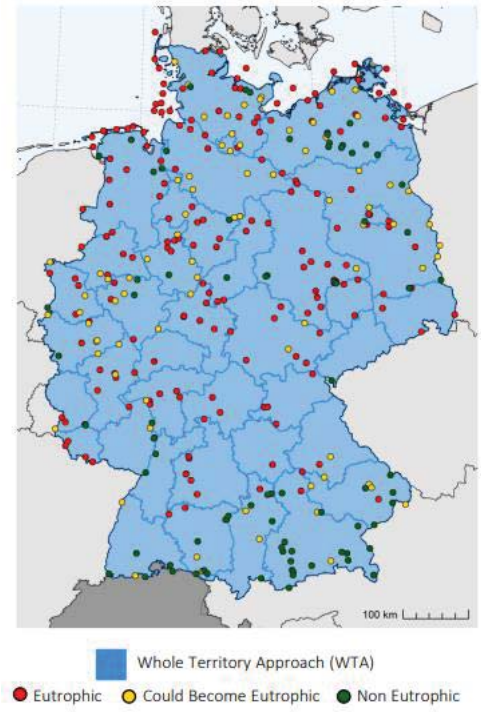
Source: 3rd RBMPs electronic reporting

Overall, Germany has refined the well-established characterisation process and improved the establishment of reference conditions. It is noted positively that for all water bodies (except 1% of the river water bodies) there are at least some reference conditions with most improvements made for the coastal waters. Overall, approaches have improved but are still not fully harmonised or, at least,

comparable, across RBDs. Consequently, some work remains to fully implement the previous shortcomings (see recommendation 2019).

Germany have assigned numerous Key Type Measures (KTMs) for many pressures. The most relevant **significant pressures** affecting the highest percentage **of surface water bodies in** Germany are **chemical pollution** (including pollution from atmospheric deposition) affecting 99% of surface water bodies, **nutrient pollution** from agriculture affecting at least 71% of surface water bodies, and **physical alteration** of habitats channel/bed/riparian area/shore affecting at least 83% of surface water bodies[2]. It is noted that the numbers from the report of the German Environment Agency (UBA) are slightly different. Those report that 77% of the surface waters and 29% of the groundwaters in Germany are affected by agricultural pressures resulting in too high emissions of nutrient- and pesticides[3]. These impacts are the same as in the previous cycle, indicating that Germany needs to significantly step up its efforts to reduce those pressures and impacts.

Figure 1. Trophic status of surface water as reported under the Nitrates Directive



Source: Joint Research Center (n.d.). JRC NITRATES DIRECTIVE - Reporting Period 7 (2016-2019) Trophic Status. [online] water.jrc.ec.europa.eu. Available at:

https://water.jrc.ec.europa.eu/portal/apps/dashboards/cb6034c2a75e4df282f8a62f90c16caa

For groundwater, the pressures with the most **significant impacts on groundwater bodies** are **chemical pollution** (40%) and **nutrient pollution** from agriculture (10%). The electronic reporting was severely delayed, this may point to existing challenges in implementing existing legal obligations on data management and reporting. Consequently, Germany is advised to further improve data quality

[2]. Workbook: WFD_SWB_Impacts (europa.eu)

[3] UBA Report – Water Framework Directive – Waters in Germany 2021 – Progress and Challenges https://www.umweltbundesamt.de/publikationen/die-wasserrahmenrichtlinie-gewaesser-in-deutschland

and data comparability by harmonising methods and electronically collected data across RBDs, on monitoring, assessments, projections, economic assessment, etc. and make all data openly available through timely publication in line with the requirements of the INSPIRE, Open Data and Public Sector Information Directive (PSI) Directives and the public sector High Value Datasets (Commission Implementing Regulation (EU) 2023/138) to help eliminate the need for reporting. Germany is also, advised to better connect data and information systems of all administrations involved in the implementation (also others than the water competent authorities) and make better use of the opportunities from digitalisation and earth observation systems.

Around 30 invasive alien species of EU concern[4] create pressures for freshwaters in Germany. From those the following invasive aquatic plants are specifically mentioned: Canadian waterweed (*Elodea nuttallii*), curly waterweed (*Lagarosiphon major*), parrot feather watermilfoil (*Myriophyllum aquaticum*), water primrose (*Ludwigia grandiflora*) and water hyacinth (*Pontederia crassipes*)[5] [6]. Also, water fern (*Azolla filiculoides*) and New Zealand pigmyweed (*Crassula helmsii*) create local problems. Particularly vulnerable are eutrophic ecosystems and modified water bodies already affected by human activities. Invasive water plants, reduce aquatic biodiversity and ecosystem functions. The combination of reduced penetration of light combined and anaerobic conditions from detritus decomposition can result in fish kills. Furthermore, the plants clog canals and irrigation ducts. Invasive alien animal species creating pressures are gobies (*Neogobius melanostomus*, *Neogobius fluviatilis*, *Ponticola kessleri*, *Proterorhinus marmoratus* and *Babka gymnotrachelus*), calico crayfish (*Orconectes limosus*) and the bullfrog (*Lithobates catesbeianus*). Invasive species have spread to varying degrees among water bodies in Germany[7], but gobies have spread to the Baltic Sea, the North Sea basin, the Danube, and Rhine basins, including tributary rivers (Main, Neckar, and Moselle). Although, all invasive species are on the rise, their impact on species composition in water bodies and the achievement of good ecological status can net be reliably estimated for all RBMPs. The international Rhine RBMP does describe measures against the further spread of certain invasive alien species.

Also as regards the preparation of inventories of emissions, discharges and losses of chemical substances, Germany has made progress, and they are now developed for all RBMPs. The electronic reporting of emissions inventories of chemicals is available for eight out of ten RBDs (exceptions are Rhine and Weser). This largely overcomes some of the previous shortcomings (recommendation 2019) but Germany still needs to address some gaps and differences in methodologies. The substances for which the most inventories have been established are mercury and its compounds, nickel, and its compounds, perfluorooctane sulfonic acid (PFOS) and its derivatives, terbutryn, total Polycyclic Aromatic Hydrocarbons (PAHs), brominated diphenylethers, isoproturon, and lead and its compounds.

[4] EASIN - European Alien Species Information Network (europa.eu)
[5] German federal research centre for cultivated plants (Julius Kühn Institute) https://www.julius-kuehn.de/media/Veroeffentlichungen/Flyer/Wasserpflanzen.pdf
[6] Hessisches Landesamt für Naturschutz, Umwelt & Geologie Invasive_Wasserpflanzen_gesamt_web.pdf (hlnug.de)
[7] https://www.bfn.de/gebietsfremde-und-invasive-arten#anchor-8237

3. Policy elements contributing to biodiversity and climate change adaptation

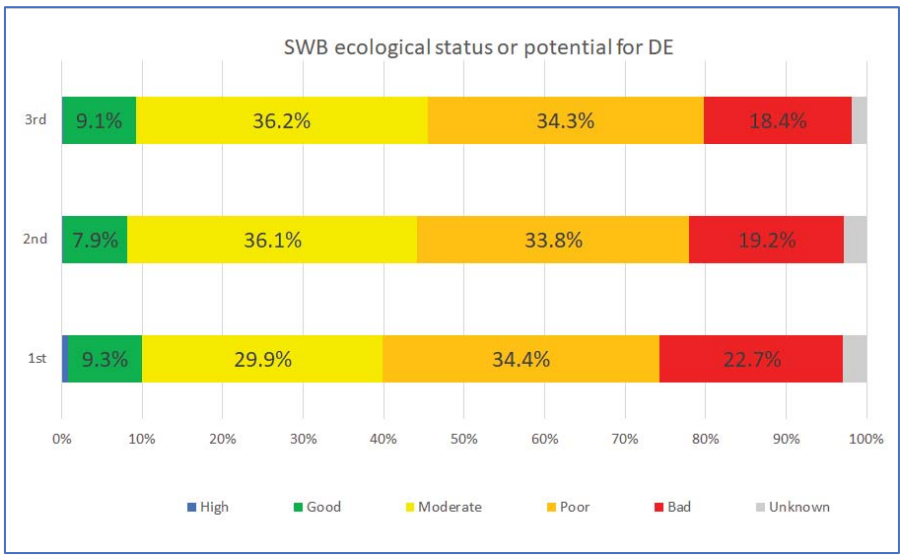
3.1 Surface Water: what is their ecological status or potential

Overall, Germany has made progress in the monitoring, assessment, and classification of ecological status/potential in surface water bodies and the identification of river basin specific pollutants. All water bodies were classified. Progress has also been made in other areas, such as the further inclusion of river basin specific pollutants.

As regards monitoring, the number of monitoring points has increased compared to the 2nd RBMPs and most stations monitor biological quality elements, physico-chemical quality elements and several hundred of river basin specific pollutants (RBSPs). Although data were incomplete at the time of assessment, the number of operational and surveillance monitoring stations amounted to at least 15542.

The surveillance monitoring covers all biological quality elements and Germany monitors most of them. For rivers, lakes, and transitional water bodies, these are: phytoplankton, macrophytes, benthic invertebrates, and fish (not phytobenthos[8]). Whereas for coastal water bodies phytoplankton and benthic invertebrates. However, in two out of four coastal waters other aquatic flora is also monitored. All general physico-chemical quality elements are now monitored in most water body types, except for coastal water bodies where only nutrient and oxygenation conditions are monitored. According to the available information, hydromorphological quality elements are not monitored under any monitoring programme. Nevertheless, in the 'ex ante analysis', the current hydromorphological conditions and the expected conditions are considered in the models to assess biological status (for quality elements sensitive to hydromorphological changes).

Figure 2. Chemical status or potential of surface water bodies, as reported in 2010, 2015 & 2021



[8] Justification accepted in the context of the intercalibration exercise

Source: e-reporting from WISE.

As regards assessment and classification, based on the electronically reported data, the share of rivers in good or high ecological status/potential has slightly increased from 8% in the 2nd to 9.3% in the 3rd RBMPs.

By 2027, the share of water bodies reported in good or better ecological status/potential is expected to be 7%. This is at odds with the analysis of the German Environment Agency (UBA) which projected an achievement of 18% of, at least, good ecological status/potential by 2027. The UBA also estimated it will take until 2045 to achieve 82% of compliance of surface water bodies in relation to ecological status.

Still, this small but steady progress in improving ecological status is at very low levels and insufficient to achieve the objectives of the Directive. Rivers in good status are mainly found upstream often in the south whereas the rivers in highly industrialised regions or transitional and coastal waters downstream have the worst ecological quality. The situation of lakes is more promising with 20% in good ecological status (which include the Lake Constance, the Müritz or the Chiemsee) and 36% in good ecological potential. The main reason for this low level of compliance are high levels of pressures from pollution and altered ecosystems.

Also, of around 37% of all reported water bodies are significantly affected by pressures from hydropower with impacts on ecological status such as the interruption of the biological and hydromorphological continuity of watercourses (preventing migratory fish of reaching their spawning grounds), direct damage to organisms by hydropower turbines (around 22 % of the fish of all ages passing through a turbine die and an even larger percentage is injured), and habitat changes affecting water levels downstream. The sum of all effects of chains of dams with successive turbines can jeopardise entire populations. Fish species such as eel, barbel, salmon and 'common nase' are particularly affected.

No information on the establishment of nutrient limits was available suggesting that Germany is not using such limits for the purpose of the assessment, as recommended by the Commission previously.

3.2 Hydromorphological changes and artificialization (HMWBs and AWBs)

In Germany, there is a very significant human intervention on the water system. Most surface water bodies are altered of pressures created by human activities (35% of the WBs are heavily modified and 17% are artificial). This entails that for around 52% of all WBs lower environmental objectives would be applicable and they will aspire to 'good ecological potential'. For the designation of heavily modified water bodies (HMWBs), the shares between rivers, lakes, transitional and coastal waters have remained largely the same as in the 2nd RBMP. However, more changes are observed for artificial water bodies (AWBs) where more than 600 AWBs have been designated mainly because of 'new uses'. Based on reported data, the reasons for this increase are not sufficiently justified.

The share of electricity from hydropower is 3.1% of total electricity production. The country has however around 7000 hydropower plants, many are very small, and most electricity comes from less than 500 plants of which a large proportion is in southern Germany. Hydropower accounts for 14% of

the electricity production in Bavaria[9] and 9% in Baden-Württemberg[10]. The ecological status of around 37% of all reported water bodies –i.e. over 51 000 km of rivers – are significantly affected by pressures from hydropower.

Overall, the designation of HMWBs is largely the result of land drainage for agriculture (66%), urbanisation (28%) and flood protection (19 %). Germany seems to have very extensively designated water bodies because of drainage for agriculture compared to other countries[11]. In some cases, several reasons apply simultaneously. For larger rivers (e.g. the Rhine) and transitional waters, navigation is the main reason for designation. Areas in the North of Germany (mainly the lowlands) where agricultural activities are intense have a particularly high percentage of HMWBs this may be due to drainage of agricultural land. In the South of Germany (mainly in the Alpine regions), HMBWs are often associated with hydropower use. In many rivers, a combination of reasons for their designation applies. Artificial water bodies are mostly the result of agriculture needs (e.g. drainage channels and ditches as well as reservoirs) or inland navigation (canals). Moreover, in the mining regions some open cast mining lakes exist.

The methodologies for the designation and definition of good ecological potential have not changed since the 2nd RBMPs. Information on the outcome of the assessment of significant adverse effects of restoration measures and better environmental options at water body level has not been found.

Overall, regrettably, the German HMWBs and AWBs are doing worse than the natural water bodies and experience more difficulties to achieve their corresponding environmental objectives even if those are of a lower level of ambition. Indeed, only 5% of HMWB and AWB achieve good or high ecological potential in comparison to 14% for natural water bodies[12]. It is noted with concern that there has been largely a negative trend since the 2nd RBMP. Whereas ecological status classes improved by 2.8% in natural waters, they got worse in 0.3% of HMWBs and AWBs, in lakes (-12.8%) with the most negative trend for the parameter phytoplankton[13] (which is a possible indicator for increased eutrophication in heavily modified and artificial lakes but might partly also be explained using a revised and stricter assessment method). Addressing this legacy of altered water ecosystems by human activities is one of the biggest challenges for Germany to reach the objectives of the WFD. Consequently, Germany is advised to develop and implement methodologies for definition of Good Ecological Potential and to rapidly improve the status of HMWB and AWBs.

Hydromorphological pressures may result from the gradual closure of open pit coal mines. The re-filling of pits with rainwater and groundwater may accelerate groundwater recovery in these regions and bring environmental benefits[14]. At the same time, coal mines also contain pollutants that will be released when pits are re-filled, thereby potentially deteriorating the chemical status of ground and surface water bodies. Also, new hydromorphological pressures may emerge where groundwater from coal pits has been feeding rivers. For instance, the Spree River (an essential source of water supply for

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[9] https://www.stmwi.bayern.de/energie/erneuerbare-energien/wasserkraft/

[10] https://www.statistik-bw.de/Presse/Pressemitteilungen/2021331

[11] By preparing of this report, Germany has designated 2 213 water bodies as heavily modified due to drainage for agriculture, while for all other electronically reported Member States it is in total 694 water bodies.

[12] Workbook: WFD_SWB_SurfaceWaterBody (europa.eu)

[13] Report: Die Wasserrahmenrichtlinie - Gewässer in Deutschland 2021 | Umweltbundesamt

[14] Bozan, C., Wallis, I., Cook, P.G. et al. Groundwater-level recovery following closure of open-pit mines. Hydrogeol J 30, 1819–1832 (2022). https://doi.org/10.1007/s10040-022-02508-2

Berlin and the Brandenburg region) in summer months carries up to 40% of the river's discharge from dewatering of lignite mining areas. Due to mine closures, and the end of groundwater pumping, the mines could turn from a water source for the Spree into a water sink. Due to lower flows, the concentration of pollutants (sulphate, iron, heavy metals, nutrients etc) in this river could increase and ecological flows could be at stake.[15]

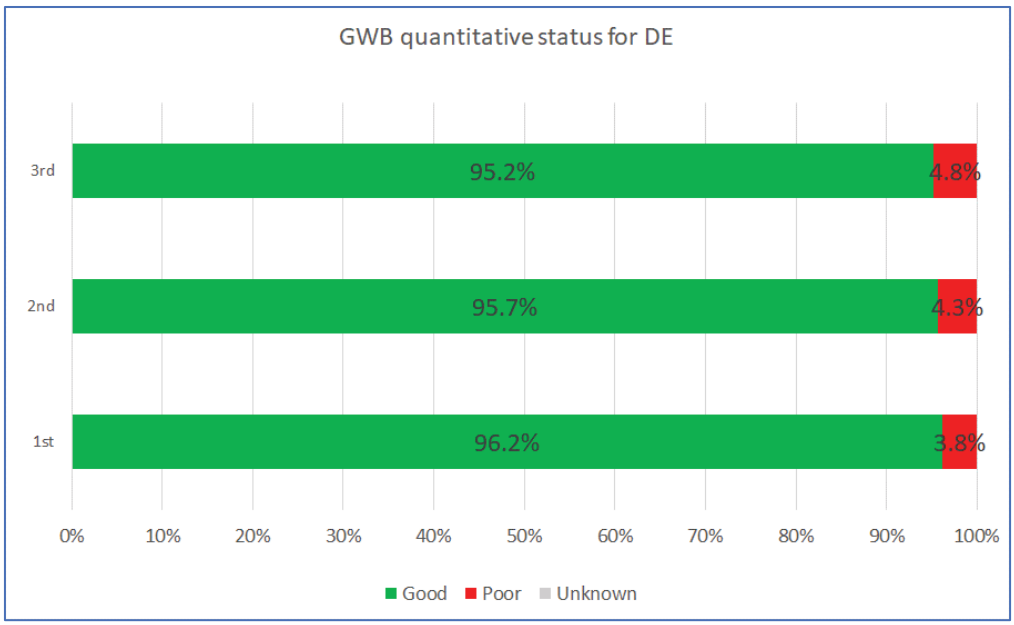
3.3 Groundwater bodies - have they sufficient water – quantitative status

Germany has delineated 1291 groundwater bodies in the 3rd RBMPs which is an increase of 9.6 %. Yet the total GWB area has remained almost the same. Hence this is the result of aggregation and/or splitting, or creation of new GWBs. So, this can entail some constraint of comparability between cycles. The assessment of the groundwater quantitative status is done according to the harmonised recommendations for action on "Consideration of groundwater-dependent terrestrial ecosystems in the risk analysis and status assessment of groundwater bodies[16]. This includes the impacts on Groundwater Associated Aquatic Ecosystems (GWAAEs) and Groundwater Associated Terrestrial Ecosystems (GWDTEs) which primarily include habitat types along watercourses, both alluvial forests and/or, wet meadows and the watercourses themselves. All RBMPs confirm that the needs of groundwater dependent ecosystems (both terrestrial and aquatic) have been assessed (as required by WFD Annex II), and often the corresponding number of areas is indicated, but the outcomes of the assessments themselves are less consistently described. Overall, groundwater levels are increasingly affected by climate change. The dry years between 2015 and 2022 (2018, 2019 and 2020 and 2022 were amongst the hottest ever recorded with precipitation shortages of 25%, 7%, 10% and 15% compared to the long-term averages)[17]. This resulted in lower groundwater levels particularly in areas in Eastern Germany prone to the negative effects of prolonged droughts. However, despite the low soil moisture levels recorded during those years, this did not affect the achievement of good quantitative status yet, according to data reported by Germany. Locally, the situation is different as deeper groundwater layers, particularly in Eastern parts of Germany, are likely still affected by the past series of dry years. The risks of increasing water scarcity are illustrated by a recent study analysing groundwater level monitoring data from around 6700 monitoring stations in Germany. The results show that at almost half of all the locations evaluated, groundwater levels have fallen in the drought years between 2018 and 2021 to the lowest level since 1990[18]. These trends should be considered when applying, as it is currently done, quite some intensive drainage of agricultural land. Increasing the water retention capacity of the land should be considered.

The quantitative status of GWBs is slowly decreasing. According to the electronic data reported by Germany in WISE, around 95% of the groundwater bodies is in good quantitative status, slightly less than in the 2nd reporting cycle.

[15] The Spree River on a drip | IGB (igb-berlin.de)
[16] Handlungsempfehlungen der LAWA zur „Berücksichtigung grundwasserabhängiger Landökosysteme bei der Risikoanalyse und Zustandsbewertung der Grundwasserkörper“: https://www.lawa.de/documents/arbeitshilfe_umsetzung_wrrl_kap_grundwasser_1575970330.pdf
[17] https://www.umweltbundesamt.de/themen/wasser/extremereignisseklimawandel/trockenheit-in-deutschland-fragen-antworten#trockenheit-aktuelle-situation
[18] https://correctiv.org/aktuelles/kampf-um-wasser/2022/10/25/klimawandel-grundwasser-in-deutschland-sinkt/

Figure 3. Quantitative status or potential of groundwater bodies, as reported in 2010, 2015 & 2021.



Source: e-reporting from WISE

The affected groundwater bodies are situated in the Danube, Elbe, Meuse, Oder, Rhine and Warnow/Peene RBDs. There are multiple reasons for failure, and they vary per region. In the Elbe, Meuse, Oder and Rhine RBDs, the poor quantitative status is largely a result of the past or current open pit mining activities, but also agricultural irrigation and the production of drinking water are important causes. Against a context of increasing droughts, the number of affected water bodies may increase in the future especially because the status assessments must include the needs of the groundwater dependent ecosystems (both terrestrial and aquatic) as required by WFD Annex II.

According to the German Federal Statistical Office most of the water extracted was groundwater (61%). The proportion of groundwater has remained stable for 18 years: it was 65% in 1998 and 2004 and stood at 61% in 2013. Despite the gradual closure of these mining activities, it will take decades until a natural groundwater situation can be established again. Finally, it is unclear if climate scenarios have been included in the prediction of future achievements of good quantitative status for groundwaters in Germany. The UBA predicts a level of compliance of 98% by 2027 and of 100% by 2045 which may appear overly optimistic in the light of climate change.

3.4 Protected Areas (identification, monitoring, objectives and measures)

It is positive to note that on protected areas the RBMPs assessed show in detail that surface water bodies, that are in water dependant Natura 2000 areas, have been included in operational monitoring programmes. It is welcome that since the 2nd RBMPs the number of monitoring sites for several protected areas have increased significantly. This is particularly remarkable for Natura 2000 areas that have increased by 7,644 monitoring sites resulting in a total of 8267 sites. Also 6695 groundwater monitoring sites for Drinking Water Protection are designated.

Table 3. Number of Water Bodies Associated with protected areas

Protected area type	Number of Water Bodies Associated with protected areas in		
	Rivers	Lakes	Groundwater
Bathing waters	441	707	0
Drinking water protection area	101	27	6695
Natura 2000	7673	1049	8267
Total	8215	1783	14962

Strikingly the number of protected areas for the abstraction of water for human consumption from rivers and groundwater bodies, as well as the number of bathing water sites decreased from the 2nd to the 3rd RBMPs. As regards the Nitrates Vulnerable Zones, Germany has designated the whole territory. The same goes for sensitive areas under the Urban Wastewater Treatment Directive. No areas have been designated for the protection of economically important aquatic species including shellfish in the 3rd RBMPs, although some were identified in the 2nd RBMPs.

Although the data are incomplete, there seems to be a low level of inclusion of such areas in comparison to the numbers reported under the respective directives. For instance, Germany reported 2291 bathing water sites for the season 2021 yet only several hundred are mentioned in the RBMPs.

Additional objectives have been set for surface and groundwater bodies associated with Natura 2000 areas only in the Ems and Meuse River basin districts but not in the others. For drinking water protected areas, Germany has set out specific objectives in its water law and specific ordinances at Länder level.

While it is welcome that the knowledge of the status of protected area is enhanced and that there are no unknowns, unfortunately this status does not appear to have changed significantly between the 2nd and 3rd RBMPs except for some slight deterioration in groundwater chemical and quantitative status. The data are not always clear and suggest that there is no strong integration between the efforts to implement the Water Framework Directive and the implementation of related EU environment laws designating protected areas across all RBDs. There seems to be significant potential for creating further synergies and effectiveness gains by better administrative cooperation, e.g. by sharing basic data for water management between different competent authorities such as those responsible for health (bathing and drinking water), nature (Natura 2000), agriculture (nitrates, pesticides) or fisheries (shellfish).

3.5 What is being done to prevent/reduce hydromorphological pressures

In the 3rd RBMP, Germany included the largest number of measures in relation to hydromorphological alterations. It noted positively that approximately 56% of surface water bodies will benefit from such measures until 2027. Moreover, Germany indicates that in 83% of all surface waters, measures are planned to reduce pollution from flow regulation and morphological changes. At the same time, the

reports also recognise that regrettably not all measures planned in the 2nd RBMP have been implemented (e.g. in the Elbe RBD, only about half of the measures planned in 2015 had been implemented by 2021).

As regards ecological flows, their determination has been harmonised across the RBDs and some have already defined and implemented them (e.g. in the RBD Oder or Elbe) (as called for by the Commission in the past) but work for others is still ongoing[19]. Issues that are not entirely clear from the content of the reports are a) related to the periodic review of permits to address hydromorphological pressures[20] b) the extent in which the concept of ecological flows considers downstream areas and countries, and c) the timeline for completing the implementation of ecological flows. With respect to the recommendation from the 2nd RBMPs compliance assessment, related to lowering the hydromorphological pressures from agriculture, there is seemingly hardly any progress. The main measures planned beyond 2027 are the following[21]:

- Renaturation measures to create habitats in water bodies (e.g. hydromorphological conditions of water bodies other than longitudinal continuity (KTM6)): 27% of surface water bodies;
- Measures establishing longitudinal continuity (e.g. establishing fish passes, demolishing old dams) (KTM5): 26% of surface water bodies;
- Measures to improve a near-natural water supply or for a dynamic flow regime and/or establishment of ecological flows (KTM7): 19% of surface water bodies);
- Knowledge base, research and reducing uncertainty (KTM14) and;
- Natural water retention measures (KTM23).

Germany is advised, when planning new dams or reservoirs, to carefully assess their environmental impacts and ensure that such interventions are part of integrated water management and water resilience strategies, which e.g. consider long-term climate scenarios.

3.6 What Germany is doing for abstractions and water scarcity

Germany has not yet experienced nation-wide scale water scarcity issues, but the situation differs considerably per region. Shortages in water availability and depleted soil moisture levels have been registered in some regions (in the Northeast and in the central regions) during some summers in the past. Irrigation demands from agriculture are relatively low in comparison to other regions in Europe. As a result, just as it was the case for the previous cycle, over-abstraction (understood as consumptive use or net consumption) has not been identified as a significant pressure at the RBD level or in significant portions of an RBD for any of the 10 RBDs. Still there are several surface and ground water bodies which are significantly affected by water abstractions for public water supply, industry, agriculture, hydropower, fish farms and other unspecified sectors. In all RBDs, where water abstraction

[19] Ramboll, et al. (December 2021): Assessment of Member States' progress in Programmes of Measures during the second planning cycle of the Water Framework Directive Reference, Member State: Germany: https://op.europa.eu/en/publication-detail/-/publication/8db873bd-6d11-11ec-9136-01aa75ed71a1/language-en/format-PDF/source-313408706

[20] in accordance with the WFD article 11(3)(e) and 11(3)(i)

[21] UBA report (p.72): https://www.umweltbundesamt.de/publikationen/die-wasserrahmenrichtlinie-gewaesser-in-deutschland

is identified as a significant pressure for GWBs and SWBs failing to achieve good status, basic and (predominantly) supplementary measures to address water abstraction are planned.

In Germany, the average annual freshwater abstraction for the period of 2016-2019 amounted to 22.54 billion cubic metres (Eurostat data). The average water abstraction over that period per sector is as follows: electricity production and cooling (44%), public water supply (23%), manufacturing industry (19%), mining and quarrying (6%), construction (5%), agriculture (2%) and other services (1%). A trend analysis for this 4-year period shows that the amount of water abstracted by agriculture (+48%) and public water supplies (+3%) have increased. Conversely, abstractions by the electricity (-31%), manufacturing (-7%) and construction sectors (-12%) have decreased[22].

There is a general recognition, that the situation will likely worsen because of climate change. In particular, the droughts of 2018, 2019, 2020 and 2022 left an impression on German water policy.

As a result, the Federal Government issued the first ever National Water Strategy in March 2023[23]. This strategy had no significant effect on the 3rd RBMPs, but it sets out 10 strategic issues and specific 78 measures which will positively address the identified shortcomings in some of the RBMPs. The strategy states: "*Water bodies and their catchment areas must therefore be managed in such a way that their functional capacity and resilience are maintained and, where possible, improved, restored, and protected for the long term. […] This requires a more integrated and systemic approach to water body management. This approach must reconcile habitat functions with the various water uses that humans want and need, under dynamically changing overall conditions*".

It is unclear how this strategy will affect the implementation of the 3rd RBMPs, but the issue of water scarcity and droughts is addressed in many RBMPs[24]. Also, climate adaptation strategies exist in many Länder. Overall, Germany has taken several basic and mostly supplementary measures on reducing pressures from abstractions in all RBDs which account for 8% of surface and 5% for ground water bodies[25]. In surface waters, these measures are largely designed to ensure a minimum ecological flow. The determinations of ecological flows have been harmonised across the RBDs[26] and some have already defined them (e.g. in the RBD Oder or Elbe).

The main basic measures to control abstraction from surface and groundwater is the concession, authorisation, and/ or permitting regime to control surface and groundwater abstractions and impoundments required by Article 11(3)(e). According to the German Water Resources Act (WHG), water withdrawals from a surface water body (e.g. lake or river) or from groundwater for drinking or industrial water supply require a permit or authorisation. For abstractions of more than 5,000 m^3/year, the need for an environmental impact assessment (EIA) must be investigated in accordance with the Environmental Impact Assessment Act (UVPG) (case-by-case assessment). An EIA is generally required for water withdrawals of more than 10 million m^3/year.

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[22] Note: conventional statistic abstraction data of Eurostat, EEA and OECD do not take account of evaporation of rainwater stored in reservoirs or of water stored in reservoirs further to abstractions from natural sources. Leakage and evapotranspiration losses can however be significant in MSs with many reservoirs and/or older irrigation and distribution systems.

[23] National Water Strategy – English version (Decision of the German Federal Government of 15 March 2023)

[24] Danube RBD (DE1000), Rhine RBD (DE2000), Weser RBD (DE4000), Elbe RBD (DE5000), Oder RBD (DE6000).

[25] UBA Report: Die Wasserrahmenrichtlinie - Gewässer in Deutschland 2021 | Umweltbundesamt

[26] https://www.lawa.de/documents/lawa-mindestwasser-barrierefrei_1689840769.pdf

In the 2nd RBMPs for water abstractions the following points were highlighted: "*Water abstractions are a major pressure, with no existence of a register, insufficient use of register, updated only every 6 years or longer, mismatch between permits registered and abstracted quantities allowed*." Since most of the German states have registers of abstractions from surface water and groundwater and a register of impoundments[27] (the Länder Berlin and Hessen did not provide information on water registers) now, the situation has clearly improved. Permits are issued by state authorities for a fixed limited period, according to criteria set at the level of Länder. Small abstractions by private households are exempted. Several states only register the number of permits but not the actual abstracted amounts (or only as rough estimates). Due to this incomplete information situation, it is impossible to say whether there is a mismatch between registered permits and quantities allowed. The German States have the possibility to temporary or permanently restrict water extractions under the Federal Water Act. Consequently, German states can refuse, or revise permits under specific conditions.

Germany is advised to increase the registration of the actual abstracted amounts to achieve the environmental objectives in the RBMPs especially in the Länder Bavaria, Thuringia, and Hessen where there are no fees in place for groundwater abstractions by (mining) industry, agriculture or municipalities. In most federal states that levy a charge, this relates both to the abstraction of groundwater and to the abstraction of water from surface waters. In Berlin, Hamburg and Saarland does the levy only cover the abstraction of groundwater. In these states, the abstraction of surface water is therefore free of charge[28]. In view of the increased occurrence of drought periods due to climate change, and the risk of over-abstractions, Germany is encouraged to keep track of the actual abstracted amounts. Also, the link between permits and ecological flows, which are increasingly defined, should be improved. On the positive side, water abstractions in Germany mostly need prior authorisation and national authorities conduct sample checks after authorisation or targeted checks after complaints to prevent unauthorised abstractions or violations of permit conditions.

The 3rd RBMPs also include measures to increase water retention, but their number and scope remain limited although this an objective featuring prominently in the German Water Strategy. The available reporting suggests that water reuse is not foreseen as a measure in any RBD with available reporting.

International cooperation on water abstraction/scarcity issues varies significantly among the international RBDs. In some cases, there is established cooperation on low flows (e.g. Meuse, Rhine). The programme "*Rhine 2040 – The Rhine and Its Catchment Area: Sustainably Managed and Climate-Resilient*", launched in February 2020, aims at improving sustainable management and climate resilience in the Rhine RBD. The backbone of the planned actions is "win-win" and "no-regret" measures that address water quality, ecology, low-flow, and high-flow aspects. It includes model projections indicating that by the end of the century (2061-2100), water temperatures will increase significantly, and average flow conditions will decrease substantially in some areas.

3.7 Adaptation to climate change

Considering the close relationship between overall water management and floods management and the importance of climate change on both, the considerations of droughts and floods are jointly addressed in this section.

[27] The 3rd RBMPs also include maps showing impoundments (e.g. reservoirs, retention basins).
[28] BUND-Studie: Die Wasserentnahmeentgelte der Länder

Germany has a requirement in national law to formulate long-term climate change adaptation programmes or measures, hence all RBMPs have addressed this topic. Moreover, each of the international RBMPs also include climate change considerations.

There is one main measure addressing climate change (national measure 509), while other measures may still be applied in response to climate adaptation assessments. Although these are not consistently listed across all RBMPs, there is evidence that all of them incorporate such considerations within RBMPs and PoMs and prioritised against national standards. All RBMPs also conduct climate checks, adopt additional measures to adapt to climate impacts and have a targeted climate monitoring programme (biological, chemical, groundwater quantity and quality).

It is welcomed that German RBMPs include various analyses of the impacts of climate change on water management, yet this happens at a relatively general level. LAWA and BLANO have subjected the catalogue of measures on which the programmes of measures are based to a climate sensitivity analysis[29]. The "climate change assessment" is however not carried out at the level of the individual programmes of measures.

Although Germany has made progress in addressing abstractions /water scarcity and has adopted a National Water Strategy (see above), there is no detailed information in the respective RBMPs which define drought and specify its current nor projected impact on individual water bodies in Germany, and the effects of this upon chemical and ecological status. Also, although all RBMPs contain information regarding seasonal droughts or water scarcity and their impacts on water use and diffuse point pollution, yet there is no direct mention of drought being the driver for the specific actions and measures within RBMPs, nor are water balances for all river basins established in detail, nor are they regularly updated and/or monitored. They should for example consider all inputs and abstractions and natural losses as well as the needs of water dependent ecosystems. Germany is encouraged to take effective measures to promote water efficiency, while maximising the use of nature-based solutions for water storage across soils and ecosystems. Drought management plans are not required by EU law but were recommended to Germany (and other Member States) by the Commission. No national or regional drought management plans exist yet, but it must be noted positively that some international river basins are either working on them or have already included them in their wider strategies (e.g. Danube or Rhine). Also, several Länder have included the issue in their adaptation or other strategies. Moreover, the 2023 National Water Strategy highlights to address droughts as part of their package of measures but not in the form of an overarching plan. Also, hardly any applications of Article 4(6) exemptions have been identified in the context of climate change. These developments are encouraging, and the consequences of droughts and effects of climate change will likely feature more prominently in future RBMPs.

As regards floods, the Floods Directive requires to consider the impacts of climate change on the occurrence of floods, and therefore in the preparation of Flood Hazard and Risk Maps (FHRMs) and Flood Risk Management Plans (FRMPs). No changes have been identified since the first Flood Hazard and Risk Maps (FHRMs). The current influence of climate change, as contained in hydrological statistical data, has been considered.

The five Flood Risk Management Plans (FRMPs) assessed refer to coordination with Germany's national adaptation strategy and refer to climate impacts and mention IPCC work. All plans have a chapter

[29] https://www.lawa.de/documents/lawa-blano-massnahmenkatalog_1594133389.pdf

providing information how climate change was considered in the development of the FRMPs on a generic level. All five plans which were assessed note that flood events will very likely change because of climate change. There is a serious possibility that peak river discharges with a high annual frequency will increase. The plans note that heavy rains with the risk of uncontrolled runoff or flash floods, with climate change, will probably occur more frequently or more intensely in the future. In catchment areas previously influenced by snow and glaciers, floods can also be influenced by temperature increases causing increased flooding due to reduction in intermediate snow storage or intensified ice melt. As a result of an accelerated rise in sea level, increased hydrological loads, higher maintenance and adaptation costs for coastal protection systems are to be expected. Thus, the FRMPs refer to shifts in the occurrence of extreme events and changes in numerical recurrence times. The five FRMPs assessed all state that, in general, all their measures ultimately contribute to adaptation to climate change. The measures contribute to limiting the consequences of the aggravated flood events that occur with climate change.

4. Policy elements contributing to zero pollution

4.1 Surface Water: what is their chemical status

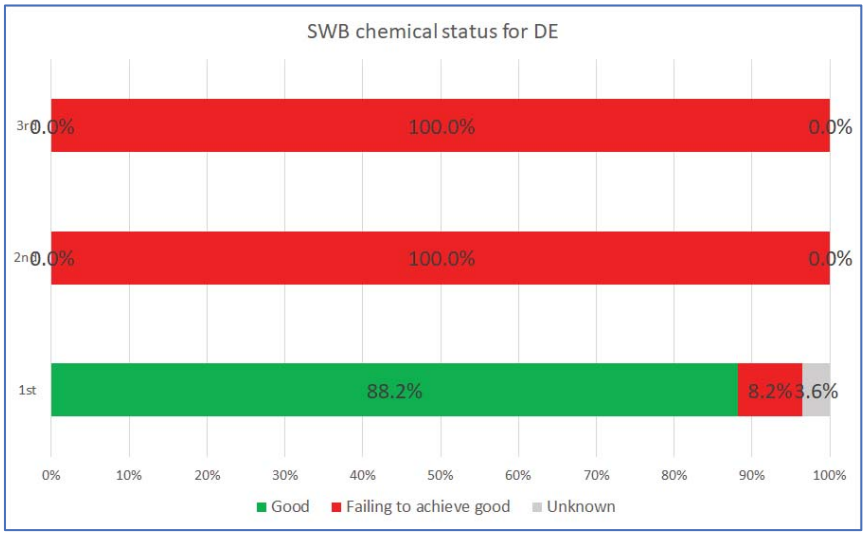
Monitoring

On chemical status monitoring, some progress has been made since the previous cycle. This includes the inclusion of 12 new priority substances as well as improved emission inventories. The level of confidence in monitoring increased as is now very high (99%). Work on long-term monitoring and analysis of trends is still not complete but in principle all substances are covered and available for trend analysis once sufficient data points for robust statistical analysis have been collected.

Reporting of emission inventories of all priority substances was carried out for all river basins. Within the assessment, apart from a partial indication of trends for a limited (less than 5) number of substances, Germany provided some information on trend analysis and if measurements were done in sediment or biota. Saxony for example has designated trend monitoring sites for biota, but only for selected parameters and only at a few overview monitoring sites (for testing). Germany has maintained its monitoring capacity. All 45 priority substances were monitored in all German RBDs, but 16 substances were identified by Germany as not being relevant in all RBDs[30]. Meaning that for each RBD the number of relevant substances monitored and included in the inventories of emissions is different. While this is probably justified it nevertheless decreases the comparability between RBDs. The Danube includes 12 substances, but the pollution load could only be quantified for 6 substances; Ems includes 12 substances; Rhine includes 27 substances, Elbe includes 35 substances; Oder includes six substances; Meuse includes 20 substances; Eider includes 10 substances; Schlei /Trave includes 10 substances; and Warnow /Peene includes four substances. Figure 4.1. shows that 100% of the surface water bodies fail to achieve good status. This is unchanged compared to the 2nd reporting cycle.

Figure 4. Chemical status or potential of surface water bodies, as reported in 2010, 2015 & 2021.

[30] These are: alachlor, atrazine, benzene, chlorfenvinphos, dicofol, 1,2-dichloroethane, dichloromethane, endosulfan, HBCDD, hexachlorbutadiene, octylphenol, pentachlorophenol, simazine, trichlormethane, quinoxyfen and carbon tetrachloride.

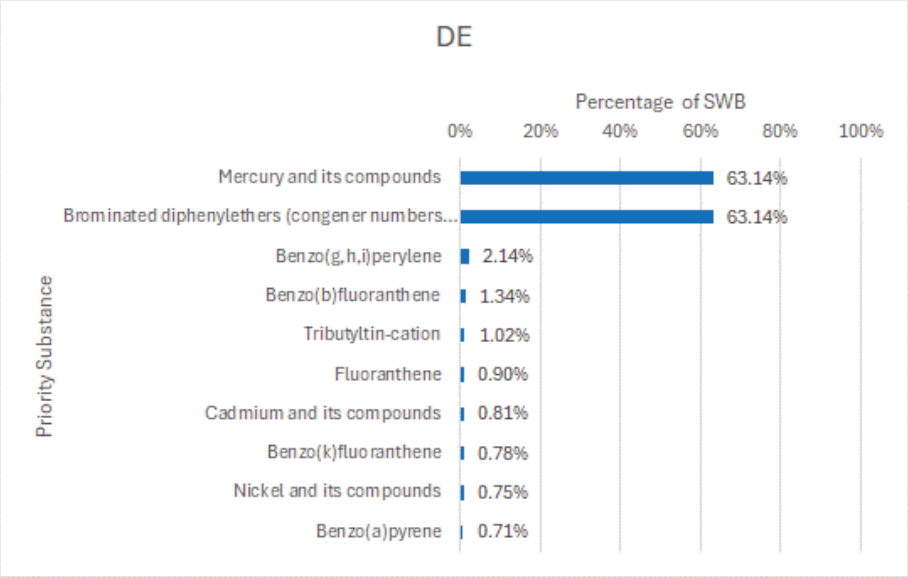


Source: e-reporting from WISE.

***Note**: Although Member States are already required to monitor all 45 priority substances that could be discharged into the river basin or sub-basin, the quality standards themselves must ultimately only be complied with by 2027. Currently, compliance is limited to the 33 substances listed in 2008 (see figure 4.2) but monitoring of all 45 substances listed in the amended Directive 2013/39/EU is already mandatory. In 2027 compliance with the quality standards for all 45 substances will become mandatory. Figure 4.3 illustrates that PFOS (one of many PFASs /forever chemicals) will likely be a newcomer that is there to stay among the top-10 polluting substances in 2027.*

Like in other countries most water bodies are affected by several pressures simultaneously and multiple pressures cause failures to achieve good status. Mostly one or more persistent pollutants are the leading cause for failure as they accumulate in the sediment of rivers and lakes or the tissue of aquatic species (biota). A chart with the top-10 of priority substances causing failure of good chemical status is included in figure 4.2.

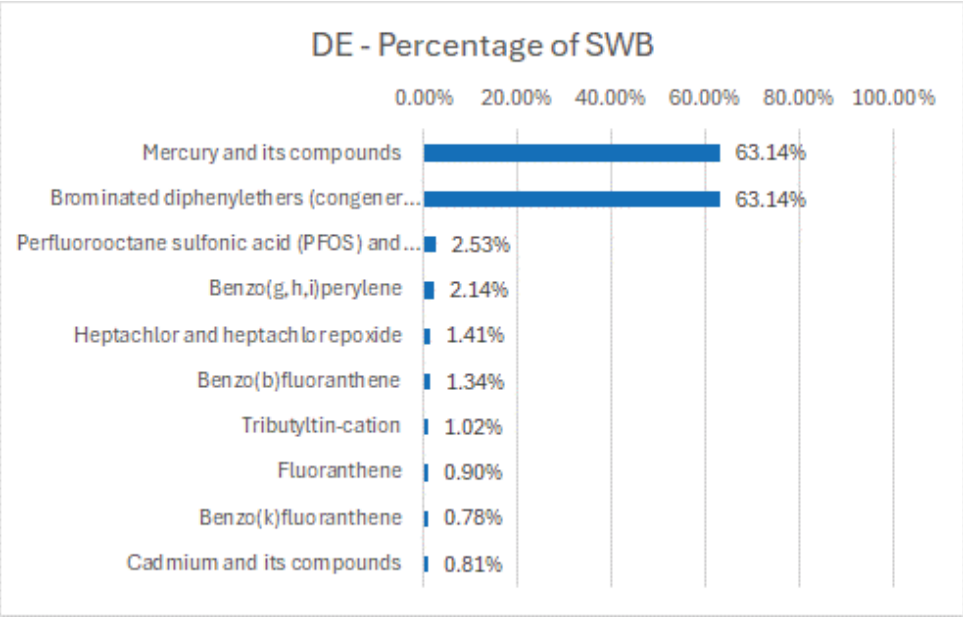
Figure 5. Overview of top-10 out of 33 most polluting substances priority substances causing failure to achieve good chemical status of surface water bodies



Source: e-reporting from WISE.

***Note**: the table lists the 10 out of 33 substances listed in Annex I of Directive 2008/105/EC*

Figure 6. Overview of top-10 out of 45 most polluting substances priority substances causing failure to achieve good chemical status of surface water bodies (including the 12 new substances added to the priority substance list i.e. numbered 34 to 45 added to Directive 2008/105/EC as amended by Directive 2013/39/EU).



Source: e-reporting from WISE.

***Note:** For the 3rd RBMP, Member States have only had the obligation to monitor them. Compliance with the Environmental Quality Standard values for these 12 new priority substances will be assessed in 2027.*

As seen for many other countries, the priority hazardous substances responsible for most of the failures are mercury and flame retardants (Polybrominated diphenyl ethers -PBDEs). Those two pollutants are responsible for the failure to reach good chemical status in over 63% of the surface water bodies. Other substances for which the most inventories are established are total Polycyclic Aromatic Hydrocarbons (PAHs), brominated diphenylethers, isoproturon, benzo(a)pyrene and lead.

Even with future measures, Germany only expects to achieve 3% of good chemical status by 2027 and 4% by 2045 mainly due to the accumulation of mercury and PBDEs in the ecosystems which is likely to persist beyond 2045.

Over 80% of all surface waters in Germany are affected by 2 to 6 pollution pressures simultaneously, and only 1% is considered unpolluted. Overall, more than 77% of the surface waters and 29% of the groundwaters is deteriorated due to agricultural pressures (mainly nutrients and pesticides). At the same time around 67% of all surface water bodies are affected by chemical pollutant emissions from the multiple sources like industry, mining, and energy sectors. Pollutants from municipalities and households impact the status of 35 percent of all the surface water bodies[31]. None of the surface waters achieves good chemical status, which is caused both by the aerial deposition of mercury originating from the combustion of fossil fuels, and combinations of other pollutants. By 2045, due the adoption of comprehensive and complex measures, a slight improvement to 4% is expected.

Simultaneously, if the ubiquitous, Persistent, Bioaccumulative and Toxic substances (uPBTs)[32] that cause most of the failures are excluded, depending on the source between 92% (WISE data)[33] and 84% (UBA data) of the surface water bodies would achieve good chemical status[34]. The variations between the RBDs are however considerable. For the Rhine RBD 59 % of water bodies would be in good chemical status (without uPBT) and in the Ems RBD this would be 96 %[35].

4.2 Groundwater Bodies: what is their chemical status

Monitoring

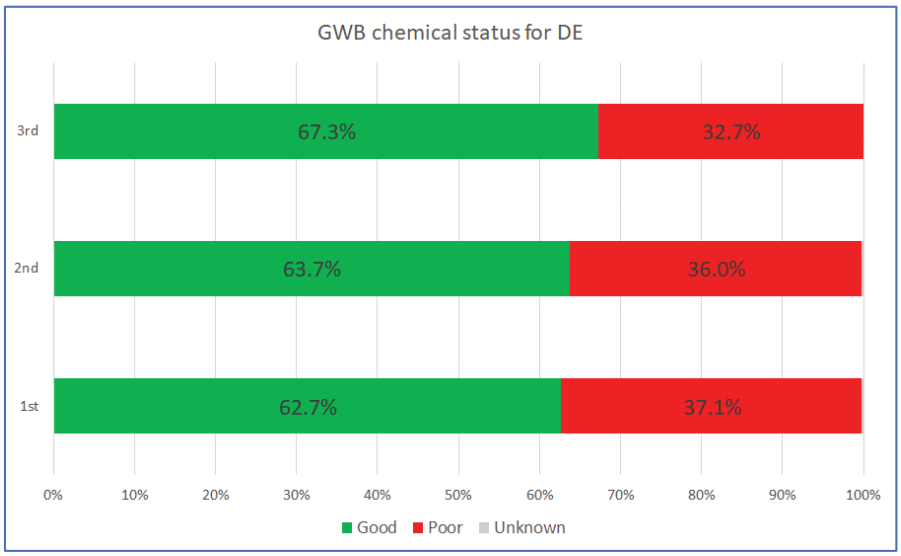
The monitoring approaches have improved but are still not fully harmonised or, at least, comparable, across RBDs and across German federal states. The chemical status of groundwater bodies is assessed against the threshold values for polluting substances mentioned in GWD Annex I and Annex II (Part B). The status assessments do mention that the water needs of Groundwater Associated Aquatic Ecosystems (GWAAEs) and Groundwater dependent Terrestrial Ecosystems (GWDTEs) and salinity were considered in the status assessment, but often without much information on how this was done and the outcomes. Since the assessment of groundwater monitoring data is decentralised in Germany, the intercomparison of monitoring, assessment, and classification of groundwater chemical status between the federal states and between previous and current RBMPs is inconsistent.

[31] Page 16 and 58 of report: https://www.umweltbundesamt.de/publikationen/die-wasserrahmenrichtlinie-gewaesser-in-deutschland
[32] The uPBTs are: mercury, brominated diphenyl ethers (pBDE), tributyltin & polyaromatic hydrocarbons (PAHs)
[33] Workbook: WFD_SWB_SWPrioritySubstanceWithoutUPBT (europa.eu)
[34] 16% of some 5000 monitoring states exceed the environment quality standards (EQS) (UBA report)
[35] WSP report: Compliance assessment of the 3rd River Basin Management Plans

Status assessment

In 2021, Germany has achieved good chemical status for groundwaters in 67.3% of the groundwater bodies. This means only very little progress is observed since the 1st RBMPs and 2nd RBMPs with 62.7% and 63.7 % respectively in good status.

Figure 7. Chemical status or potential of groundwater bodies, as reported in 2010, 2015 & 2021.



Source: e-reporting from WISE.

The main parameters causing the failure to achieve good status are: nitrogen (mainly nitrates and ammonia), pesticides and, to a lesser extent, heavy metals (e.g. cadmium, lead, mercury and zinc), sulphate, phosphate, and chloride. Indeed, across Germany 22% of the groundwater bodies are polluted by nitrates and exceed the concentration threshold set by both EU GWD and Nitrates Directive. Regrettably for those GWBs polluted by nitrates, 16% show an upward trend indicating that increasing pollution levels. Only in 1% of the GWBs, the trends depict some improvement although concentrations are still clearly above the threshold. For the rest, the trend is stable or unknown. The areas of exceedance coincide with the hotspots identified under the Nitrates Directive[36] which lists 27% of the monitoring stations above the threshold in the last reporting period covered the first 4 years of the 2nd RBMPs[37]. As a result of the ruling of the European Court of Justice under that Directive, Germany took additional measures during the 2nd RBMP (see section 4.3) but they have not yet resulted in groundwater quality improvements.

In Germany 9.5% of GWBs are in poor status because of pesticides**.** Active substances that frequently cause failure to achieve good status are: Atrazine, Dimethachlor, Metazachlor, Bentazone, Metolachlor and Chloridazon (aka Pyrazone). Some active substances are approved for use in the EU. Other substances are banned, but e.g. for Chloridazon those bans only came into effect in 2018 and have thus not yet resulted in any substantial improvements.

[36] SWD(2021) 1001 – Part 19/38

[37] Commission report on the implementation of the EU directive on the protection of waters against nitrate pollution from agriculture https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC1000

4.3 What Germany is doing to combat pollution from agriculture

Germany identified pollution from agriculture as one of the main pressures in all RBMPs. Overall, more than 77% of the surface waters and 29% of the groundwaters is deteriorated due to agricultural pressures (mainly nutrients and pesticides). Although some progress has been made, gaps and challenges in controlling diffuse pollution from agriculture remain in all RBDs[38]. Therefore, Germany should continue its efforts to address these pressures and take effective measures. In response to a ruling of the European Court of Justice in relation to the Nitrates Directive, Germany adopted a revised Fertilizer Ordinance (entering into force on 30/04/2020)[39]. The associated designation of nitrate contaminated areas is considered one of the main measures in the 3rd RBMPs. Germany estimates that this measure alone will reduce the level of fertiliser use up to 20%.

In addition, Germany has carried out gap assessments that quantify the necessary load reductions at the level of water bodies in all RBMPs. However, the results of this assessments are not reported in a systematic and comparable manner and not always linked to the planned measures. Examples are available with the biggest gap reduction identified in the Weser RBMP where the planned agricultural measures are expected to reduce the gap for nitrogen by 40% by 2027.

In the 3rd RBMPs, measures to reduce nutrient pollution from agriculture are planned in over 50% of the SWBs and GWBs. For pesticides pollution, the planned measures will be applicable in 10% of the SWBs and 7% of GWBs. Over 40% of the measures to reduce nutrient pollution for groundwaters apply in drinking water protected areas[40]. The funding of these measures is secured from a combination of EU funds, in particular the CAP, and national or Länder funding. From 2010 to 2027, Germany estimated a total of EUR 7.9 billion (or 13% of the total investment)[41] for the reduction of diffuse pollution sources.

The German CAP Strategic Plan (SP) contains various support schemes for beneficial practises for climate and environment[42]. This includes management of grassland in a more nature-conserving way, which adds up to 1.9 million hectares and around EUR 1 billion allocated as EcoSchemes In addition, other interventions contribute to improve water quality, such as reducing the use of pesticides. Around 30% of the agricultural land will benefit from support for practices to improve soil and water quality using biological pest management and Germany has a target to have 20% of agricultural land being farmed organically by 2030[43] and a strategy to get to 30% while in 2022 it is 10%[44].

Despite these efforts, Germany predicts that its efforts will not be sufficient to reduce nutrient pollution and achieve good status by 2027 also due time lag between the application of the measures

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[38] Thünen Report - Quantifizierung aktueller und zukünftiger Nährstoffeinträge und Handlungsbedarfe für ein deutschlandweites Nährstoffmanagement – AGRUM-DE (thuenen.de)

[39] Contents of the Fertilzer Ordinance of 30.04.2020 : Lower Saxony Chamber of Agriculture (duengebehoerde-niedersachsen.de) / https://www.bgbl.de/xaver/bgbl/start.xav?start=%2F%2F%2A%5B%40attr_id=%27bgbl120s0846.pdf%27%5D#__bgbl__%2F%2F*%5B%40attr_id%3D%27bgbl120s0846.pdf%27%5D__1709488045515

[40] UBA Report: https://www.umweltbundesamt.de/publikationen/die-wasserrahmenrichtlinie-gewaesser-in-deutschland

[41] Over 85% of the costs of implementing measures in Germany are borne by the federal states, regional and local authorities (DE: Länder & Kommunen) and the federal government.

[42] Mapping and analysis of CAP strategic plans (2023-2027)

[43] At a glance: Germany's CAP Strategic Plan (europa.eu)

[44] Developments in organic farming - Statistics Explained (europa.eu)

and the resulting improvements in water quality. Consequently, Germany should conduct a more comprehensive gap assessment for diffuse pollutant loads from agriculture (nutrients, agrochemicals, (incl. (PFAS containing) pesticides) across waters in RBDs and link them clearly and directly to additional prevention and mitigation measures in the RBMPs (as per WFD Article 11(3)(h)), to facilitate the achievement of WFD objectives. This includes considering long term alternatives to intensive agriculture by transitioning to sustainable agriculture, which is especially relevant in regions where pressures are particularly high, including more organic farming.

4.4 What Germany is doing to combat pollution from other sectors

Germany has taken many measures to address pollution from sectors other than agriculture and has, in general, improve its management of this type of pollution by increasing measures associated with Key Types of Meaures (KTMs) and by linking measures and pollution. However, not all RBMPs provided the same level of detail when it comes to linking individual substances explicitly to KTMs and specific measures to combat pollution as well as the availability of gap analysis. Moreover, Germany argues that delays in implementing measures are often attributed to (financial/personnel) resource constraints and general acceptance of a measure which hinder the pollution related objectives across multiple RBDs. While this is partially the case for priority substances and priority hazardous substances, these shortcomings are most noticeable for River Basin Specific Pollutants.

Having said this, Germany provided targeted information on basic measures required under WFD Article 11. Use of an authorisation and/or a permitting regime to control wastewater point source discharges (in line with WFD Article 11(3)(g)) was reported for all German RBDs including surface and groundwater. The register of wastewater discharges is available in all German RBDs for surface and groundwater. In none of the German RBDs, wastewater discharges were waived from permitting or registration obligations. Measures to eliminate or reduce pollution of priority substances and other substances (WFD Article 11(3)(k)) are reported to be in place in all RBDs in Germany. However, RBMPs note that the recent reviews of the lists of priority substances have affected the outcomes of chemical status assessments and will require further emission reductions.

The sectors that need to reduce their emissions further are industry, mining, municipalities and households[45]. For around 2% of SWBs and 3% of GWBs it is mentioned that industry is taking measures to address water pollution, often related to the remediation of contaminated sites. Increasing attention is also given to reducing heat pollution from cooling water from energy and industrial production. In the light of continuously increasing water temperatures due to climate change, such (additional) heat pollution increasingly affects the aquatic biodiversity. Measures to reduce impact from mining activities are planned in 1% of the SWBs and 4% of the GWBs. As regards groundwater, measures are often related to managing their levels which has indirectly also an effect on the mobilisation of pollutants, e.g. heavy metals. In the Weser RBD some measures are also related to the salt pollution from mining activities.

On the positive side, the 3rd RBMPs illustrate that more detailed information on emission inventories (for point sources and to a lesser extent for diffuse sources) has been provided mainly in relation to the discharges of priority substances. This suggests that more efforts are undertaken with a wider coverage. However, it is not fully clear if all industrial discharges and emissions, including salt

[45] Report: Die Wasserrahmenrichtlinie - Gewässer in Deutschland 2021 | Umweltbundesamt

emissions, are listed in a complete and up-to-date publicly accessible inventory of emissions in line with article 5 of Directive 2008/105/EC.

It is also unclear whether Germany is working on reducing pollution loads by means of revising of existing water pollution permits. This is paramount to address remaining persistent pollution challenges that will worsen due to climate change. In this context, licensing authorities and/or the Federal Government are also urged to set emission limit values for the discharge of PFAS containing waste waters into the Rhine to replace the current indicative values that are not legally enforceable. Doing so would also be in line with the findings of the EU analysis report of the 2022 ecological disaster in the Oder River. One of the recommendations of that report is to review existing permits for industrial emissions and wastewater discharges to lower pollutant loads and introduce obligations to temporarily suspend or limit discharges in case of emergencies, while considering the new obligations under the revised IED and UWWTD.

4.5 What Germany is doing to combat significant pressures – overall assessment of the Programmes of Measures

The 3rd RBMPs seems more detailed than before, with a larger number of measures and more detailed associations between Key Types of Measures (KTMs) and pressures.

Germany identified 75 national basic measures (10 KTMs) and 443 national supplementary measures (18 KTMs) which have been clearly mapped against the KTMs. It appears that the programme of measures covers all water bodies which are not in good status. Germany identified several obstacles which are responsible for the lack of progress in the implementation of measures planned in the 2nd RBMPs. These include, delays, lack of finance, lack of mechanism, lack of measures, measures are not cost-effective as well as land availability, acceptance, and staff resources. International cooperation is coordinated well with the national work on programme of measures and complements it, where necessary.

It is welcome that Germany has taken a uniform approach for the reporting of gap indicators for achieving good status in all RBMPs and a catalogue of measures available in the Member State. The measures are linked to a pollution type as well as the pressures and impacts.

Key pressures identified in Germany are:

- Flow regulation and hydromorphological changes for agriculture, municipalities and households, energy generation, flood protection, navigation, and mining. In Germany around 86% of the water bodies are affected by significant pressures in this category;

- Diffuse pollution sources causing emissions of pollutants from agriculture (nutrients and pesticides), mining, urban areas, contaminated sites or abandoned sites and spills following accidents. In Germany 98% of the surface water bodies and 42% of the groundwater bodies are polluted by substance inputs from diffuse sources as they occur almost everywhere;

- Atmospheric deposition of air pollutants from industry, agriculture, and households;

- Point sources for substance inputs from municipalities and households, industry, and commerce, mixed and rainwater, mining, or contaminated sites. Substance inputs from point sources affect

32% of surface water bodies. The points sources are mainly attributable to industry, municipalities and households, storm water overflows via combined sewage and rainwater as well as mining.

Water abstraction for industry and commerce, agriculture, mining, public water supply, power generation, shipping, or fishing industry. Germany characterises water abstractions as significant if they, for example affect fish fauna and macro-zoobenthos (animal organisms at the bottom of the water body) and prevent the water body from achieving good status. This is the case in 9% of surface water bodies and in 4% of groundwater bodies.

5. Exemptions and economics

5.1 To what extent are exemptions applied in Germany

Germany makes a considerable use of exemptions of all types. It should be noted that more than one exemption type can be applied to the same surface or groundwater body. In the 3rd RBMPs, Germany has significantly improved the transparency and justification for the exemptions applied in comparison to the previous RBMPs. It is worth noting that Germany embraces a new 'transparency approach' which depicts a –according to Germany- realistic timeframe for the achievement of WFD objectives well beyond the legal deadline. Based on this approach Germany claims that the environmental objectives will only be achieved beyond 2045. This means that Germany expects to fail compliance with good status in many water bodies (e.g. 16% of all SWBs are estimated to fail good ecological status by 2045). Because of this approach, Germany used mainly time exemptions (WFD Article 4(4)) with justifications why achievement of good status by 2027 will not be reached. Germany has adopted a harmonized approach for applying exemptions (see LAWA document[46]). Detailed information on the types of exemptions used is included below and demonstrates that time related exemptions are indeed the most frequently used.

Article 4(4) exemptions (time related exemptions) applied for reasons of technical feasibility, disproportionate costs, or natural conditions. Below a more detailed overview of the applied reasons:

The time exemptions for SWBs are applied for reason of:

- Natural conditions: 51.2% for ecological status/potential and 63.1% for chemical status;
- Technical feasibility: 24% for ecological status/potential and 0.4% for chemical status;
- Disproportionate costs: 24.2% for ecological status/potential and 0.7% for chemical status.

The time exemptions for GWBs are applied for reason of:

- Natural conditions: 16.8% for chemical status and 0.9% for quantitative status;
- Technical feasibility: 4.6% for chemical status and 0.7% for quantitative status;
- Disproportionate costs: 0.2% for chemical status.

[46] Approach to justifying Article 4 exemptions in Germany is set out in the Methodology document (2020 edition) Microsoft Word - 03_Anlage_3_LAWA-HA_Fristverl.docx

The main pressures resulting in the need to apply time exemptions come from pollution caused by atmospheric deposition, stormwater overflows and historical pollution for surface waters and agriculture, mining, and historic pollution for groundwaters. The large number of SWBs using temporary exemptions because of natural conditions linked to diffuse atmospheric deposition is worth investigating in more detail as this is mainly linked to air pollution from mercury which nowadays is mainly associated with burning of fossil fuels not natural sources of pollution (such as volcanoes). To a lesser extent time related exemptions can also be related to natural conditions and used to justify delays in restoring water quality, restoring hydromorphological conditions, recovery from acidification, delays in restoring water levels, and recolonisation of native species to recover from invasive alien species.

Germany should ensure that the time related exemptions are correctly motivated and safeguard that all measures necessary for achieving good status or potential by end of 2027 are identified and initiated (implemented) during this cycle, to avoid unjustified time exemptions beyond 2027 (i.e. other than exemptions based on natural conditions).

Article 4(5) exemptions (lowered objectives) are justified on grounds that the achievement of the objectives would be infeasible or disproportionately expensive. Below a more detailed overview of the reasons. The assessment shows that they have been used much more sparsely.

- Infeasibility: 0.2% for ecological status/potential and 0.1% for chemical status;
- Disproportionately expensive: 0.2% for ecological status/potential and 0.1% for chemical status.

The lowered objectives for GWBs are applied for reasons of:

- Infeasibility: 1.3% for their chemical status and for 1.5 % for their quantitative status;
- Disproportionately expensive: 0.3% for chemical status and 0.1% for quantitative status.

Article 4(6) exemptions (temporary deterioration)

Germany hardly uses these exemptions (0.4 % of all water bodies for quantitative status).

Article 4(7) exemptions (exemption to the obligation of non-deterioration, in case of new modifications or sustainable human development activities)

In the 3rd RBMPs. A quite limited amount of Article 4(7) exemptions have been applied to allow for the deterioration of the status of certain water bodies without being in breach of the Directive. These exemptions have been applied to two surface water bodies and 14 groundwater bodies groundwater bodies. Although some information was provided, this aspect may merit further investigation as the WFD requires solid information and justification on the exemptions under Article 4(7) WFD in particular for new projects.

The exemptions provided for by the Groundwater Directive (Article 6.3) have not been applied significantly in the 3rd RBMPs. Three GWBs in the Weser RBD are associated with these exemptions due to salt pollution from mining.

5.2 Use of economic analysis and water pricing – cost recovery

Financing of measures

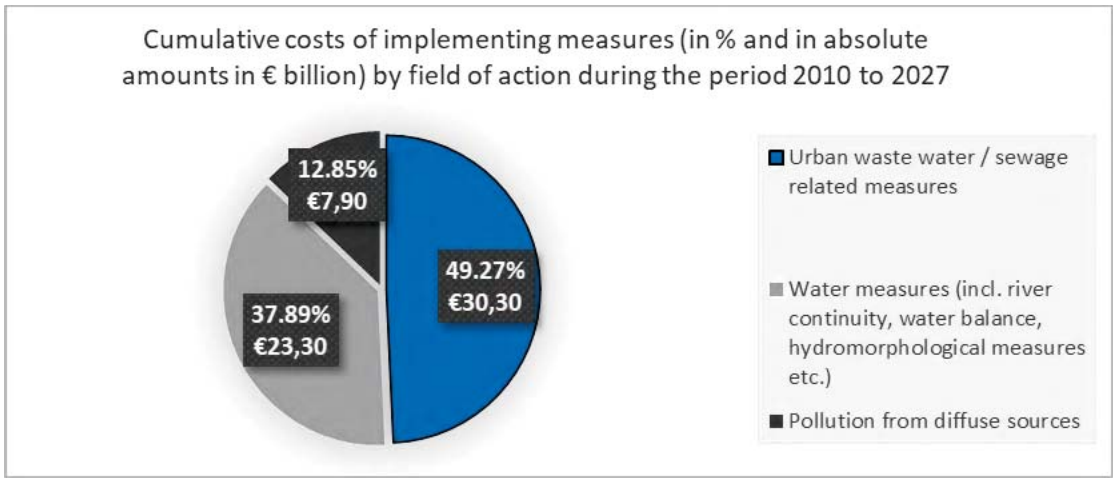
The success of the implementation of the WFD depends on sufficient financing and investments. A clear improvement compared to the last management cycle is that in Germany, a uniform approach has been adopted for financing measures. In previous cycles, the numbers were calculated differently in the various federal states. The harmonised method specifies the following main areas of action[47]:

1. Improvement of wastewater treatment
2. Reduction of nutrient inputs from agriculture to water
3. Improving the continuity of watercourses
4. Improvement of water balance (only where relevant)
5. Improvement of water structure – Habitats improvements above ground water bodies
6. Reduction of mining impact on water bodies (only where relevant)
7. Remediation of contaminated sites (only where relevant)

The total investment costs for the implementation of measures already implemented since 2010 and planned until 2027, are around EUR 61.5 billion[48]. By way of comparison, in 2013 alone Germany spent €19.2 billion on roads, which is around €230/year per capita. With estimated water protection costs of around 21 billion for the period between 2022 and 2027 this means water protection costs are six times lower, with average cost of around €37/year per capita. It is noted very positively that, compared to the previous cycle, the investments increased from EUR 15 billion to EUR 21 billion. Figure 5.2a shows that of the 61.5 billion to be spent until 2027 roughly 49.3% will be attributed to wastewater related measures. Around 12.85 % (€ 7.9 billion), will be spent on reducing inputs from diffuse sources (incl. agricultural emissions) and 37.9% (€23.3 billion) on water measures ensuring continuity, improving water management and structure. Of the latter roughly 14.3 billion is attributed to improving water structures and habitats, 8.1 billion to improving the continuity of water courses, 0.7 billion to improving the water balance, and 0.2 billion to reducing the impacts on standing waters (including impacts from mining and contaminated sites). These beforementioned figures are higher than those included in the individual RBMPs and reported to the EU which add up to total of EUR 17,6 billion. However, it is noted that some estimates were derived from cost of measures in the 1st RBMPs[49]. In view of the water quality situation in Germany, current levels of investment seem insufficient to adequately address the situation. Consequently, investments should increase investments and ensure adequate financing to facilitate a timely and full implementation of the Programmes of Measures to reach WFD-objectives.

Figure 8. Cumulative costs of implementing measures (in % and in absolute amounts in € billion) by main field of action during the period 2010 to 2027

[47] https://www.lawa.de/documents/lawa-hintergrunddok-harmonisierte-berichte-final-stand-16-02-2021-barrierefrei_1689844556.pdf
[48] UBA report P.96 https://www.umweltbundesamt.de/publikationen/die-wasserrahmenrichtlinie-gewaesser-in-deutschland
[49] Consultant report, p. 144 and https://www.lawa.de/documents/handlungsanleitung-wirtschaftliche-analyse_2_3_1607682700.pdf



Source: UBA report based on harmonised data Federal States (LAWA) / Berichtsportal WasserBlick/BfG. Date: 29.03.2022

More than 80% of the costs of implementing measures in Germany are borne by the federal states and regional and local authorities (DE: Länder & Kommunen), 10% by private individuals and less than 5% by the federal government. The Länder and municipalities finance a large part of the measures through taxpayers' money and through fees and levies. This raises concern on the correct application of the polluters pay principle.

Cost recovery and adequate contribution by water use sectors - water pricing

The cost recovery of water services is mainly implemented by following three instruments:

1. A drinking water fee (DE 'Trinkwasserabgabe').

All RBMPs include a clear description of how the costs are recovered for drinking water services. For households the prices vary between the different RBDs as it is strongly influenced by regional conditions. The average consumption price per cubic meter was € 1.72/m³ but varies from 0.96 €/m³ (Eider RBD) to 1.88 €/m³ (Rhine RBD). The cost recovery rates for drinking water supply are around 100% nationwide. So far resource costs were hardly influenced by water scarcity, except in individual regional cases. The extensive droughts of 2018, 2019 and 2020 illustrate that this will change due to climate change. The quality of raw water, for drinking water abstractions using surface waters or shore infiltrates will increasingly be negatively affected[50]. Overall, each inhabitant pays on average €200 /year for their drinking water supply and wastewater drainage.

[50] https://www.lawa.de/documents/lawa_auswirkungen_des_klimawandels_auf_die_wasserwirtschaft_1552292350.pdf

2. A nationwide wastewater levy (DE 'Abwasserabgabe').

In Germany, companies and (semi) public bodies (municipalities, wastewater associations[51]) pay a wastewater levy collected by the municipalities that clean and dispose of wastewater. The levy is partly based on the discharged amounts (quantity and harmfulness) of polluting substances. Finally fixed basic wastewater charges are in place in all RBDs (charges based on population-weighted municipal data). The average is €18.22/year but varies between €2.81/m^3 (Meuse) to €83.04/m^3 (Warnow/Peene)[52]. Germany reports full (financial) cost recovery for wastewater services with recovery rates between 93% and 105%. Despite these levies, treated wastewater and stormwater overflows still contain levels of nutrients and micropollutants that cause failures of achieving the WFD objectives. Nevertheless, industrial point source pollution and diffuse pollution with nutrients and pesticides remains a major pressure for German surface water quality. Consequently, Germany is encouraged to making better use of the 'polluter-pays principle' and where needed eliminate environmental harmful subsidies whilst ensuring affordable, just and fair pricing mechanisms for all water users in line with Article 9 WFD.

3. Water abstraction charges (DE: Wasserentnahmegelt)

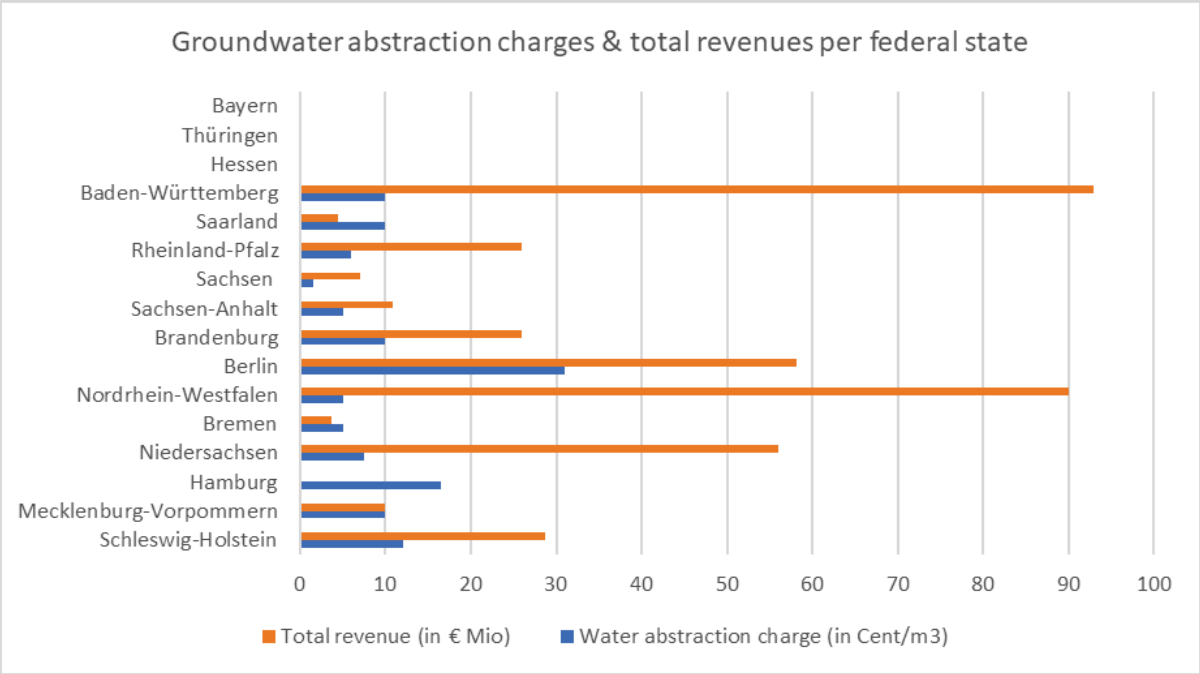
The federal states set their own charges for water abstraction. Most of them (13 out of the 16) levy charges for the abstraction, extraction, or discharge of groundwater (see figure 5.2b). The charge (in € Cent/m3) vary between 1.5 to 31 cent/m3 and the total revenues per Federal State between €3.7 to € 90 million. In Bavaria, Thuringia, and Hessen there are no ground abstraction charges at all (2023 data). For the abstraction and discharge of cooling or irrigation water from surface waters e.g. in the areas of hydropower, agriculture, mining, cooling and drinking water, the prices per cubic metre vary between 0.5 and 31 cents - if a charge is levied at all[53]. There are several exceptions to the application of the cost recovery principle for water services. For example, agricultural irrigation in Baden-Württemberg, Mecklenburg–Western Pomerania, North Rhine-Westphalia and Rhineland-Palatinate is free of charge. Detailed information on forecasts and volume estimates of water supply and demand of water services is also lacking. Consequently, efforts towards full application of the cost-recovery principle to all water use activities impacting water bodies should be increased.

[51] Under German law, groups of municipalities often jointly establish 'special-purpose water associations' or 'special-purpose wastewater associations' (abbreviated to WZV (Wasserzweckverband) or AZV (Abwasserzweckverband)). They are tasked with wastewater treatment, water supplies, water maintenance or flood protection. Tariffs are put in place to cover the costs of the joint tasks.

[52] Figures 3-25 and 3-27 of Annex 6 of Elbe RBMP

[53] https://www.bund.net/fileadmin/user_upload_bund/publikationen/fluesse/fluesse_wasserentnahmeentgelt_studie.pdf

Figure 9. Groundwater abstraction charges and total revenues per federal state in Germany 2020



(Source: Annex 6 - Elbe 3rd RBMP, page 57: https://lvwa.sachsen-anhalt.de/fileadmin/Bibliothek/Politik_und_Verwaltung/LVWA/LVwA/Dokumente/4_landwirtschaftumwelt/404/Seite_Wasser_bewegt/FGG_Elbe/Anhaenge/Bewirtschaftungsplan_FGG_Elbe_2021_Anhang_A6.pdf.

The financing of measures related to industry and industrial emissions, including the mining industry, generally are financed directly by these industries if they are in operation. At the end of the activities, e.g. when mines are closed down, these measures are only partly covered by the mining companies but also by public finances. Overall, nearly a third of al SWBs are associated with measures to tackle pollution from municipalities and households. Nature-based solutions are also used, e.g. removing soil sealing so that rainwater drains directly into the ground which also has a positive effect on local groundwater levels and therefore prevents water scarcity. At a small scale, also the connection of remote areas to the sewerage systems or putting together small wastewater treatment plants into bigger ones, which improves treatment efficiency, are planned. In addition, the costs of many precautionary and damage prevention measures, such as precautionary measures in water protection areas, voluntary quality assurance measures that go beyond the legal requirements, etc., are already covered.

6. WFD recommendations

Recommendations - Germany should:

1. Address the identified lack of compliance of achieving good status by increasing the level of ambition and reducing the compliance gap as much as possible until the next reporting cycle.

   This means in particular, that:

   Where the objectives of the Directive for a specific water body cannot be met and exemptions are invoked, Germany should do so in line with ECJ jurisprudence on the restrictive interpretation of exemptions and better justify the use of exemptions, providing sufficiently detailed justifications at the level of the water body and ensure that their application is regularly reviewed. This implies:

   a) Ensuring that the lowering of objectives (Article 4(5) is well documented and justified, in particular as regards disproportionate cost and unfeasibility taking into account the shortcomings in the implementation to date.

   b) Recognising that the possibilities for time extensions (Article 4 (4)) are extremely limited and will no longer be allowed after 2027 (except if duly justified for natural conditions).

   c) Much more information on the exemptions under Article 4(7) WFD for new projects, including new dams and water transfers. This includes better justifications of the use of these exemptions by detailing cumulative effects, the assessment of better environmental options, and the measures taken to mitigate the adverse impacts of new developments.

2. Increase the investments and ensure adequate financing in prevention and restoration to ensure achievement of good status as required by the Directive, e.g. by making better use of the 'polluter-pays principle' and by eliminating environmental harmful subsidies whilst ensuring affordable, just and implementing fair pricing mechanisms for all water users in line with Article 9 WFD. When using EU funds, ensure that programmed amounts under Cohesion Policy 2021-2027 and the Common Agriculture Policy are adequately implemented and effectively contribute to implement the Programmes of Measures to reach the objective of the Water Framework Directive and Floods Directive.

3. Identify and put in place supplementary and other additional measures to reduce existing persistent environmental challenges (pressures) preventing the achievement of good status, and based on robust gap analysis, as those pressures are aggravated by climate change (pollution concentrates in times of less water availability).

   This implies, inter alia:

   a) Reduction of nutrient pollution including the setting and achievement of maximum nutrient loads in all river basin districts to achieve the objectives of Water Framework Directive (WFD), Marine Strategy Framework Directive (MSFD) and the Nitrates Directive (ND).

b) Addressing diffuse chemical pollution, e.g. including pesticide pollution by reducing their use and phasing out unsustainable practices.

c) Further prevent and reduce point source pollution to address nutrients and priority substances and river specific pollutants, e.g. by reviewing existing permits for point source emissions to lower pollutant loads or introduce obligations to temporarily suspend or limit discharges in case of emergencies (like the low flow conditions during the Oder ecological disaster).

d) Expanding the efforts on nature-based solutions including renaturalisation and ecosystem restoration which will reduce the hydromorphological pressures on its water bodies (e.g. reducing pressures from agricultural drainage).

e) More consistently measuring hydro morphological pressures on surface waters and assess river continuity as a hydromorphological quality element for classifying the ecological status and potential of all river water bodies, including those that are heavily modified and artificial. To improve those conditions Germany should step up its efforts to improve river continuity, ensuring minimum ecological flows, improve the general hydrological situation and increase fish protection.

f) More systematically include the water needs of groundwater dependent ecosystems (both terrestrial and aquatic) in the assessment of the quantitative status of groundwater bodies.

g) Provide, in its RBMPs, more complete information on the designated protected areas, and ensure the water bodies associated with protected areas have an appropriate level of protection and, where needed, appropriate additional objectives and measures.

h) In view of climate change induced increased dry periods, and the risk of over-abstractions, to increase and harmonise the use of abstraction permits and fees for all water users nationwide, monitor the actual abstracted amounts, and harmonise the inconsistent use of exemptions from water fees. This concerns e.g. groundwater abstraction fees for industry, agriculture and/or municipalities, but also different regimes for surface water abstractions, abstraction fees and exemptions across the federal states.

4. A further improvement of governance and a better coordination between the different administrative levels and authorities dealing with the implementation of the WFD and other related pieces of legislation. This also includes removing obstacles identified in the implementation of measures, such as insufficient administrative capacities and resources.

   Points of attention are:

   - Strengthening synergies and coordination between the WFD, MSFD and other EU legislation (notably BHD) by taking adequate and coherent measures.
   - Improving the EU wide comparability of the results of the status assessments, specifically regarding the assessment of physico-chemical and hydromorphological conditions related to their sensitive biological quality elements. Existing excellent cooperations between Member States on reference conditions and monitoring is acknowledged and praised by the Commission and should preferably by widened to EU-wide harmonised classification and status assessments;

5. Improving the work on international River Basin Management Plans for e.g. the Oder and the Rhine rivers.;
    - Similarly, also for groundwater bodies international cooperation is almost non-existent;
    - Furthermore, on water abstraction an increased transboundary cooperation is desirable;
    - Although overall, the work on applying ecological flows is on-going implementation elements between the Länder can be further harmonised e.g. in relation to ecological flows and the interrelations with water abstractions and related permits.
6. Further close knowledge gaps and improve data availability, access to data, as well as data quality and comparability by harmonising methods and electronically collected data across river basin districts and marine regions, on monitoring, assessments, projections, economic assessment, etc. and make all data openly available through timely publication in line with the requirements of the INSPIRE, Open Data Directive /Public Sector Information (PSI) Directives and the public sector High Value Datasets (Commission Implementing Regulation (EU) 2023/138) to help eliminate the need for reporting. This implies better connecting data and information systems of all administrations involved in the implementation (also others than the water competent authorities) and make better use of the opportunities from digitalisation and earth observation.
7. Enhance the consideration of climate change in all its RBMPs ensuring that the actions identified under the new National Water Strategy are already implemented during the 3rd RBMP. Where relevant measures for climate resilience and drought management should be developed to achieve the objectives of the WFD more effectively. Failure to do so will make it increasingly difficult to achieve the Directive's objectives and, in some cases, might even lead to a deterioration of waters where progress has been achieved.

SECTION B:

FLOODS DIRECTIVE

7. Flood risk management under floods directive (FD)

The Directive requires each Member State (MS) to scan its territory for flood risks, assess the potential adverse consequences of future floods for human health, the environment, cultural heritage, and economic activity, identify the significant risks, map the flood extent and the potential adverse consequences, and take measures to reduce the flood risk. These activities are reflected in (a) the preliminary flood risk assessments, or PFRAs (including the identification of areas of potential significant flood risk, or APSFRs), (b) the preparation of flood hazard and risk maps, or FHRMs, and (c) the establishment of flood risk management plans, or FRMPs. The preliminary assessments, mapping and planning for flood risk are repeated in six-yearly cycles.

There are ten Units of Management (UoMs) in Germany, which are the same as the Water Framework Directive's River Basin Districts (RBD). Fluvial and sea water floods are considered as potentially significant sources of flooding in Germany. Germany has designated 732 Areas of Potential Significant Flood Risk (APSFRs). The impacts of climate change on flood risk have been considered in Germany at the time of the second preliminary flood risk assessment. For inland flooding modelling was carried out by linking global and regional climate models with water balance models, to obtain statements about future climate change. For the future climate projections, the development scenarios of the Intergovernmental Panel on Climate Change (IPCC) were used as a basis. For coastal flooding a "climate surcharge" on dykes is applied to cover risks due to future climate change driven sea level rise.

7.1 Flood hazard and risk maps

Germany is using online map portals[54] for their FHRMs. FHRMs were prepared at the national level and show the whole country. Maps for floods with low probability (>1/200 years), with medium probability (1/100 years) and with high probability (1/10 – 1/30 years) are provided. There is however a difference between the Laender regarding what is considered as low and high probability (e.g., 20 years, 25 years). The medium probability is set to 100 years return period, as this is set in the German water law (reflecting the FD). Flood extent is shown on all maps. Water depth is shown on all maps. Number of inhabitants is clearly shown on all maps. Likewise, type of economic activity is shown on all maps. Industrial Emissions Directive (IED) installations are shown and potentially affected protected areas identified in Annex IV(1)(i), (iii) and (v) to Water Framework Directive (WFD) are included in the FHRMs.

Germany has for the second FHRMs reported one single GIS Portal compared to several hundred maps for the first FHRMs. Germany provided for all APSFRs internet links to information that give an update on any changes to the maps or to the process used to develop the maps since the previous reporting of FHRMs. The internet link refers to a LAWA[55] guidance document that has recommendations on the national level for the development of FHRMs. In 2018 LAWA published recommendations for the establishment of flood hazard maps and flood risk maps. These recommendations have been applied in all German Laender (federal states). This common approach sets a framework for the Laender to fulfil the requirements of the Floods Directive via their individual mapping of flood risk.

[54] https://geoportal.bafg.de/karten/HWRM/

[55] Bund/Länder-Arbeitsgemeinschaft Wasser (federal/state working group on water).

In terms of changes of contextual information (i.e. the way in which information about the maps is conveyed to the public) since the first FHRMs, a noteworthy change is that Germany is now using one geoportal with all the information stored digitally there. For the first FHRMs there was a mix of approaches, with some Länder using geoportals and others only providing PDF maps. For several Laender, PDF maps and geoportals still are in use, which PDFs can be accessed via the national geoportal. Both formats provide more detailed scales (e.g., PDF maps in North Rhine Westphalia at 1:5 000, geoportal Bavaria at 1:1 200) than the national geoportal. There has also been progress with the harmonisation of the categories of the legends (e.g., water depth, potential impacts). Common elements in all risk maps are people affected, IED plants, land use (agricultural and forestry areas, transport routes, surface water, settlements, industrial and commercial areas) and cultural heritage (however, not all maps of all Länder refer to UNESCO and not all include protected heritage sites of national/regional importance).

In terms of changes in methodologies used to prepare flood hazard maps since the first FHRMs, no changes have been identified. Concerning changes in methodologies used to prepare flood risk maps since the first FHRMs, in contrast to the first FHRMs, now the same approaches for all potential adverse consequences are applied across all UoM.

Climate change in the second FHRMs

As regards the consideration of climate change effects in the preparation of flood hazard and risk maps, reference is made to section 3.7 on ‘adaptation to climate change’.

7.2 Flood risk management plans

Objectives and measures

The ten FRMPs can be downloaded online via a web page[56]. All German FRMPs have the same four general objectives, which were set in the first FRMPs. These objectives are on a high level and are based on the risk management cycle. In terms of adverse consequences, it is only mentioned that with the objectives, a "reduction of the adverse consequences for all protected assets is aimed for". The second FRMPs also have the same specific objectives under these four general objectives. The specific objectives were redefined for the second FRMPs. Two general objectives and their specific objectives aim to reduce the vulnerability and to mitigate new risks and reduce existing risks. Several specific objectives refer to non-structural initiatives. Germany reported preparedness measures for all its UoMs, including measures for flood forecasting and early warning. However, no specific information is provided on the established Early Warning Systems. Germany reported measures for land use in all UoMs and are found in the five plans assessed. Germany reported that the total number of individual measures is 35 721, and the number of aggregated measures is 11 044. The FRMPs assessed, though not providing the same detail, include a set of types of measures to be implemented. Germany has set priorities (very high, high or medium) for all the measures it reported in EIONET. The plans assessed do not, however, contain the prioritisation for each measure, though they note that measures are assigned either very high, high or medium priority. 29 873 are reported as very high priority (64%), 15 350 as high priority (33%) and 1 572 as moderate priority (3%). The shares for these priorities were very similar in the first FRMPs. The prioritisation of measures was primarily conducted based on a

[56] https://www.wasserblick.net/servlet/is/118755/

LAWA guidance document. 12 384 measures, 26% of the total, were reported as completed, 6 532 measures (14%) were reported as in ongoing construction, 16 431 measures (35%) were reported as ongoing maintenance, 5 248 measures (11%) were reported as in preparation, and 6 170 measures (13%) were reported as not started. The five FRMPs assessed provide overviews of the progress of measures since the first FRMPs, in terms of their progress towards the specific objectives. It is stated in the plans that economic considerations have a role in the planning processes (and the implementation of measures is done on several levels and responsibility is with different stakeholders), but no cost-benefit analysis (CBA) was carried out in the preparation of the FRMPs, and no detail is provided on the approach for CBA. Nature conservation is mentioned in some plans assessed, but no details are provided. Natural water retention measures (NWRMs) are found in all plans assessed. Germany has reported that coordination with the WFD was an aspect considered in all its FRMPs. The FRMPs assessed cite the necessity of coordination with River Basin Management Plans (RBMPs), and the obligation to foster the achievement of the WFD objectives. Measure types are categorised according to whether they support, hamper, or have no effect on the implementation of the WFD. The five FRMPs reviewed all refer to the use of public funds for flood measures; All FRMPs refer to the national Flood management programme (Nationales Hochwasserschutzprogramm[57]) and to funding by the governments of the Federal States, which also have specific funding programmes for flood measures.

Consideration of climate change in the second FRMPs

As regards the consideration of climate change effects in the preparation of flood risk management plans, reference is made to section 3.7 on 'adaptation to climate change'.

Governance

The five FRMPs that are part of international river basins provide only limited information, referring to general coordination mechanisms. The FRMPs that are part of international river basins with a river basin commission refer to coordination via existing mechanisms. The FRMPs for the Danube and Elbe also refer to bilateral coordination with neighbouring Member States. The FRMP for the Schlei /Trave refers to continuous coordination as well as annual exchanges between Germany and Denmark on the respective implementation of the Floods Directive on the border area, including on measures taken.

In all five UoMs assessed, the competent authorities made significant efforts for public consultation and for the active involvement of stakeholders, using a broad range of methods from an early stage in planning. As a result, a wide range of stakeholders contributed actively during the various stages of the plan development.

Progress identified in the second FRMPs

The national flood web portal informs the public about flood warnings and a mobile app was developed to provide up-to-date information on water and flood levels. Germany prepared one FRMP per UoM, including the Rhine UoM, in contrast to the first FRMPs, when Germany prepared FRMPs at both Federal State and UoM levels. This more uniform approach indicates closer coordination among the Federal States on flood risk management. Besides, the second FRMPs follow a common structure, also indicating closer coordination across Germany. In the second FRMPs, Germany has developed a

[57] https://www.lawa.de/documents/230531-broschuere-10-jahre-nhwsp-barr_1685951529.pdf

system to measure the progress towards the objectives. Based on this system, each of the plans assessed presents the progress made towards the objectives since 2010. The progress is provided for the four objectives and for their sub-objectives. The criteria for the prioritisation of measures and their application are now described in the second FRMPs. The FRMPs assessed clearly identify the responsible authorities for monitoring the implementation of measures and overall progress. The second FRMPs explain that CBA is carried out as part of the planning of measures, therefore it can be assumed that it is used for the prioritisation of measures. National recommendations for the coordination of the FD and the WFD have been developed. All five FRMPs assessed now refer to coordination with Germany's national adaptation strategy, though they do not provide details. Germany's catalogue of flood measures underwent a climate assessment, and as a result all its measures were climate proofed on a generic level (though details on this assessment were not provided).

8. FD recommendations

Based on the reported information and the FHRMs and FRMPs assessed, the following recommendations are made to enhance flood risk management, i.e. Germany should:

- Present potential future impacts of climate change in the FHRMs or impacts should be discussed in a background document;
- Further harmonise between the UoMs return periods for the three probability scenarios for flood hazard mapping or explain why this is not the case;
- Consider pluvial flooding in the FHRM;
- Provide details in the FRMP on how the FHRM was used in the choice of objectives and measures;
- Where possible link the FRMP's objectives to quantitative indicators and be timebound (building on the qualitative monitoring of progress that Germany already does);
- Provide information in the FRMP on the expected timetables for the implementation of measures;
- Set out in the FRMP a clear overview of the use of cost-benefit analysis (CBA) and the methodology behind it;
- Provide detail in the FRMP on coordination with other Member States in international river basins, next to referring to international FRMPs for further information;
- Where appropriate, consider in the FHRM the flow velocity or relevant water flow and the FRMP flood conveyance routes, as these are relevant to emergency response.